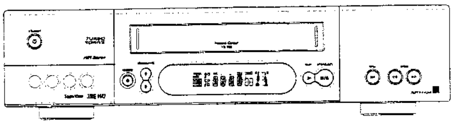
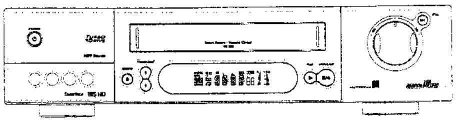
**Video Cassette Recorder** **Deck: Turbo Drive** **APOLLO 20**

Service
Service
Service

# VR800/02/07/16/39/58
# VR805/071/161/391
# VR850/02/07/16/39/58





# Service Manual

**Evolution: AA**

## Contents

Chapter

1 Table of contents per page
Survey of features
Survey of PCBs and PCB location
Technical data
Safety instructions
Supplementary service information
Front/rear view of the video recorder
Description of the controls and connections and direction for use

2 Error diagnosis system
Servicing of SMD's
Dismantling of the set
Circuit description

3 Electrical adjustment instructions
Survey of abbreviations used
Wiring diagram
Block diagram
PCB layout
Circuit diagrams
Measurements

4 Tape deck documentation
Adjustments
Exploded view of the tape deck
Parts list tape deck

5 Cabinet exploded view
Parts lists cabinet and PCB's

## Survey of types:

VR800, VR805: Longplay, FM Audio
VR850: Longplay, FM Audio, Jog/Shuttle

## Survey of versions:

| | |
|---|---|
| /02 | PAL B/G German Stereo |
| /07/071 | PAL I, NICAM |
| /16/161 | PAL B/G, NICAM & German Stereo |
| /39/391 | PAL B/G & SECAM L, NICAM |
| /58 | PAL B/G & SECAM BG/DK |

## Survey of remote controls:

| | | | |
|---|---|---|---|
| VR800: | english: | RT188/101 | 4822 219 10561 |
| | french (/39): | RT188/104 | 4822 219 10562 |
| VR805: | english: | RT198/101 | 4822 219 10584 |
| | french (/391): | RT198/104 | 4822 219 10583 |
| VR850: | english: | RT587/101 | 4822 219 10563 |
| | french (/39): | RT587/104 | 4822 219 10564 |

## Survey of tape decks:

| | | |
|---|---|---|
| VR800, VR805: | WDQ-S4/2 | 4 Video+ 2 FM-Audio heads |
| VR850: | WDQ-S4/2 S | 4 Video+ 2 FM-Audio heads, Jog/Shuttle |

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Published by GH9868 Videq Service Department Printed in the Netherlands © Copyright reserved Subject to modification GB 4822 726 15538

PCS 93695 GB

PHILIPS

# Table of contents

Page

## Chapter 1
## TECHNICAL DATA AND FEATURES

Front page 1-1
Table of contents 1-2
Survey of sets and features 1-3
Survey of sets and PCBs, Technical specifications 1-4
Description of the system for publication of changes 1-5
Safety instructions 1-6/7
Survey of direction for use 1-8
Direction for use 1-9

## Chapter 2
## TOOLS FOR ERROR DIAGNOSIS

Dismantling of the set 2-1/3
Servicing of SMDs 2-4/5
Error diagnosis system 2-6/15
Circuit descriptions 2-16

## Chapter 3
## PRINTED BOARDS

Adjustment procedures 3-1/5
List of abbreviations 3-6
Wiring diagram 3-7
Block diagram Video 3-8/9
Block diagram Audio 3-10
Block diagram Digital 3-13
Block diagram power part 3-14/15

*Power supply ASM*

PCB drawing ASM 3-16
Circuit diagram ASM 3-17

*Mother Board*

PCB drawing Mother Board 3-18/21
Circuit diagram (PS) 3-22
Circuit diagram Front End (FV) 3-24
Circuit diagram Stereo Decoder (FM_STEREO) 3-25
Audio FM (AF) circuit diagram 3-26
Circuit diagram Erase Oscillator (ER) 3-27
Audio linear-AL circuit diagram 3-28
Video Signal Processing (VS) circuit diagram 3-31
Head Amplifier (HA) circuit diagram 3-32
SECAM Processing (VS_SEC) circuit diagram 3-35
Chroma Noise Reduction (CNR) circuit diagram 3-36
In/Out (IO)circuit diagram 3-37
Central Control (AIO1) circuit diagram 3-38
Port Expander (PE) circuit diagram 3-40
Central Control (AIO2) circuit diagram 3-41
Deck Electronics (DE ) circuit diagram 3-42
Circuit diagram FOME, FF 3-44
On Screen Display/VPS/PDC (VPO) circuit diagram 3-45

*Nicam Decoder QNIC*

Circuit diagram QNIC 3-46
PCB drawing QNIC 3-47

Page

*Display Control ADCP3*

PCB drawing ADCP3 3-48
Circuit diagram ADCP3 (DC) 3-49

*Keyboard PCB AKP31*

PCB drawing, Circuit diagram AKP31 3-50

*Connector PCB ACP3*

PCB drawing ACP3 3-50
Circuit diagram ACP3 3-51

## Chapter 4
## TAPE DECK

*Deck parts replacement*

Auxiliary tools for deck adjustment 4-1
Deck layout diagrams 4-2
Lift 4-2
Head disc 4-3
A/C Head 4-4
Threading motor 4-4
Capstan motor 4-4
Pressure roller 4-4
Roller unit right 4-4
Roller unit left 4-5

*Adjustments*

Tape path 4-5
„Roller unit left; roller unit right“ 4-5
A/C Head 4-5
Horizontal distance 4-6
Brake band 4-6
Tape tension adjustment 4-6
Friction clutch control 4-6
Reverse brake control 4-6
Top view, Underside view 4-7

*Exploded view*

Cleaning and lubrication 4-8/9
Parts list 4-10

## Chapter 5
## PARTS LIST

Exploded view of cabinet parts 5-2
Cabinet parts 5-3
Power supply 5-4
Mother Board 5-5/11
Nicam Decoder QNIC 5-12
Display Control ADCP3, AKP31 5-12
Connector PCB ACP3 5-13
Complete PCBs, Cables 5-14

## Features

| Specification Items | VR800/02 | VR800/07 | VR800/16 | VR800/39 | VR800/58 | VR805/071 | VR805/161 | VR805/391 | VR850/02 | VR850/07 | VR850/16 | VR850/39 | VR850/58 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Backup Clock | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs | 7hrs |
| Tuning - presets | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 | 99 |
| Reception | | | | | | | | | | | | | |
| PAL B/G | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| PAL I | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | | ✓ | |
| PAL D/K | | | | | ✓ | | | | | | | | ✓ |
| SECAM L/L' | | | | ✓ | | | | ✓ | | | | ✓ | |
| SECAM BG | | | | ✓ | ✓ | | | ✓ | | | | ✓ | ✓ |
| SECAM DK | | | | | ✓ | | | | | | | | ✓ |
| German Stereo | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| NICAM | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ |
| Rec/Pb PAL | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Rec/Pb SECAM | | | | ✓ | | | | ✓ | | | | ✓ | |
| Rec/Pb MESECAM | | | | ✓ | ✓ | | | ✓ | | | | ✓ | ✓ |
| NTSC Playback | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Modulator | Pal G | Pal I | Pal G | - | Pal G/K | Pal I | Pal G | - | Pal G | Pal I | Pal G | - | Pal G/K |
| Auto Search | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Auto Install | | ✓ | | | | ✓ | | | | ✓ | | | |
| Guide Channel Mapping | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Time/Date Download | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Microphone in | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Headphone Out | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Synchro edit | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Auto Tape Length Recognition | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Wind/Rew. Time (E180) | 90s | 90s | 90s | 90s | 90s | 90s | 90s | 90s | 90s | 90s | 90s | 90s | 90s |
| VISS | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Studio Picture Control | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Natural Colour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Smart Picture | | | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| VPS/PDC | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| ShowView | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ |
| VideoPLUS + | | ✓ | | | | ✓ | | | | ✓ | | | |
| Rec.Prep. Mode Scart 1/2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Audio Dubbing | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| NexTView Link (pin 10) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## PCBs & Tape Decks

| page 3- | *POWER SUPPLY*<br>16 | *MOTHER BOARD*<br>18-45 | *NICAM BOARD*<br>46 | *DISPLAY CONTROL*<br>48 | <br>50 | *TAPE DECK* | |
|---|---|---|---|---|---|---|---|
| | ASM1 | AMB | QNIC (ANIC) | ADCP3 | ACP3 | WDQT-S4/2 | WDQT-S4/2S |
| VR800/02 | ● | ● | | ● | ● | ● | |
| VR800/07 | ● | ● | ● | ● | ● | ● | |
| VR800/16 | ● | ● | ● | ● | ● | ● | |
| VR800/39 | ● | ● | ● | ● | ● | ● | |
| VR800/58 | ● | ● | ● | ● | ● | ● | |
| VR805/071 | ● | ● | ● | ● | ● | ● | |
| VR805/161 | ● | ● | ● | ● | ● | ● | |
| VR805/391 | ● | ● | ● | ● | ● | ● | |
| VR850/02 | ● | ● | | ● | ● | | ● |
| VR850/07 | ● | ● | ● | ● | ● | | ● |
| VR850/16 | ● | ● | ● | ● | ● | | ● |
| VR850/39 | ● | ● | ● | ● | ● | | ● |
| VR850/58 | ● | ● | ● | ● | ● | | ● |

| GB<br>**Technical Data** | D<br>**Technische Daten** | F<br>**Caractéristiques** | |
|---|---|---|---|
| Mains voltage | Netzspannung | Tension secteur | 220 – 240 V |
| Mains frequency | Netzfrequenz | Fréquence | 47 – 63 Hz |
| Power consumption: | Leistungsaufnahme: | Puissance absorbée: | 16 W during operation |
| with Low Power Standby | Standby mit geringem Verbrauch | avec la fonction veille faible consommation | < 4 W |
| Ambient temperature | Raumtemperatur | Température ambiante | +10°C to +35°C |
| Relative humidity | Relative Luftfeuchtigkeit | Humidité relative | 20 – 80 % |
| Weight | Gewicht | Poids | 4.3 kg |
| Fast forward/rewind time | Vor-/Rückspulzeit | Temps (re-)bobinage | typ. 95s (E180 cass.) |
| Position of use | Betriebslage | Position d'emploi | horizontally, max. 15° |
| Video resolution | Video-Auflösung | Résolution vidéo | ≥ 240 lines VHS |
| Audio | Audio | Audio SP: | 80Hz – 10kHz (±8dB) |
| | | Audio LP: | 80Hz – 5kHz (±8dB) |
| | | FM Audio: | 20Hz – 20kHz (±3dB) |

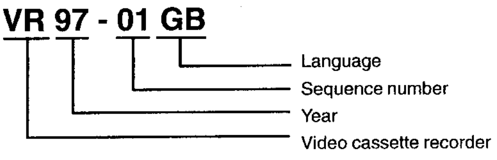
| NL<br>**Technische Gegevens** | E<br>**Datos Tecnicos** | I<br>**Dati Tecnici** | |
|---|---|---|---|
| Netspanning | Tensión de red | Tensione di alimentazione | 220 – 240 V |
| Netfrequentie | Frecuencia de red | Frequenza di rete | 47 – 63 Hz |
| Opgenomen vermogen: | Consumo de potencia: | Potenza assorbita: | 16 W during operation |
| met Low Power Standby | con standby de bajo consumo | in attesa a basso consumo | < 4 W |
| Omgevingstemperatuur | Temperatura ambiente | Temperatura ambiente | +10°C to +35°C |
| Relatieve vochtigheid | Humedad relativa | Umidità relativa | 20 – 80 % |
| Gewicht | Peso | Peso | 4.3 kg |
| Vooruit/terugspoeltijd | tiempo de (re-)bobinado | Tempo di (ri-)avvolgimento | typ. 95s (E180 cass.) |
| Gebruikspositie | Posición de uso | Posizione di funzionamento | horizontally, max. 15° |
| Opplossend vermogen | Resolución video | Risoluzione video | ≥ 240 lines VHS |
| Audio | Audio | Audio SP: | 80Hz – 10kHz (±8dB) |
| | | Audio LP: | 80Hz – 5kHz (±8dB) |
| | | FM Audio: | 20Hz – 20kHz (±3dB) |

# Modifications

## Description of the system used for publishing modification data and supplements to the service manual.

All modification data and supplements to the Service Manual are published by means of Service Information bulletins.

Each Service information has a number, for example :


VR 97 - 01 GB
Language
Sequence number
Year
Video cassette recorder

A Service Information bulletin concists of a front sheet, as the case may be followed by supplementary and/or replacement sheets.

Replacement sheets serve to replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number, for example 5-1a. Page 5-1a then takes the place of page 5-1.

Supplementary sheets are inserted between the existing sheets in the Service Manual. These sheets can be identified by an additional figure following the page number, for example 5-1-1.

Sheet 5-1-1 should be inserted after page 5-1.

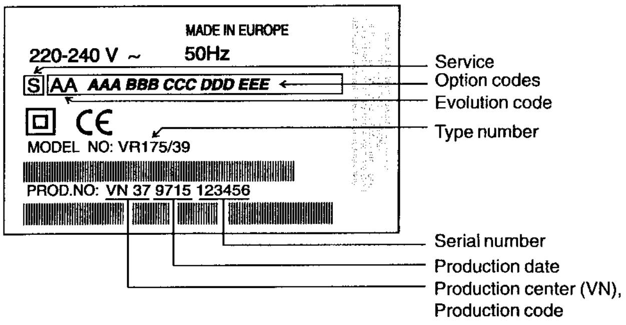
## Description of the system by means of which modifications are indicated in the recorder.

All important parts of the recorder, such as tape deck, p.c. boards and modules, are provided with a sticker. These stickers specify a number of product data. The meaning of this data will now be explained for the most important sections.

### The complete recorder

The type plate is located at the back of the recorder, below an example of such a type plate is given.

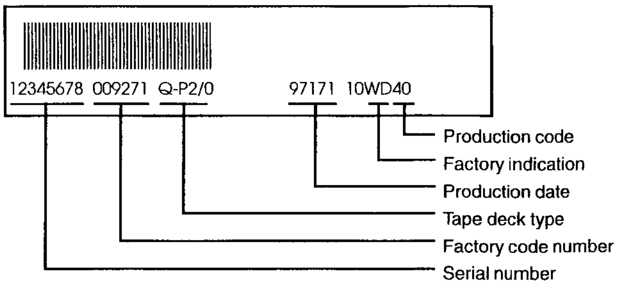
Type plate :


MADE IN EUROPE
220-240 V ~
50Hz
S
AA
AAA BBB CCC DDD EEE
MODEL NO: VR175/39
PROD.NO: VN 37 9715 123456
Service
Option codes
Evolution code
Type number
Serial number
Production date
Production center (VN),
Production code

Note :

- In the case of an important modification to the recorder the production code on the type plate is increased by one.
  E.g. 37 becomes 38.
- In the case of an important modification to the service documentation the evolution code on the type plate is increased by one.
  E.g. AA becomes AB.

### Tape deck


12345678 009271 Q-P2/0
97171 10WD40
Production code
Factory indication
Production date
Tape deck type
Factory code number
Serial number

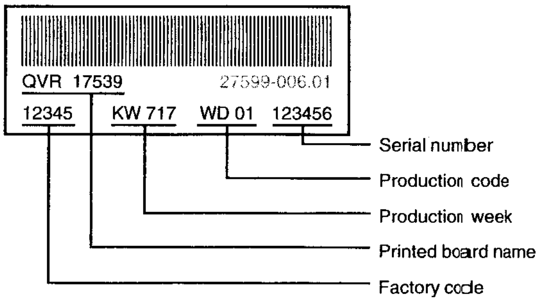
Note :

The production code and the serial number on the tape deck need not correspond to the production code and the serial number on the type plate.

### Printed panels

The stickers are generally located on the track side of the module.

Example :


QVR 17539
27599-006.01
12345
KW 717
WD 01
123456
Serial number
Production code
Production week
Printed board name
Factory code

Remarks :

The production code number will not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one. E.g. 6635.1 becomes 6635.2.

## Safety instructions

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.

  Safety components are marked by the symbol ⚠

- All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are conneted with the same potential as the mass of the set via a wrist wrap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to prelude short-circuit or to prevent a specific circuit from being rendered unstable.

### Remarks

- The direct voltages and oscillograms ought to be measured relative to the set mass.
  EXCEPTION
  At the power supply, the DC voltages and the oscillograms at the primary side are measured to LIVE GND.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

## Sicherheitshinweise

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Originalersatzteilen identisch sind.

  Sicherheits-Bauteile sind mit der Markierung ⚠ versehen

- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftmässige Behandlung von Halbleitern im Reparaturfall kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenntransformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

### Anmerkungen

- Die Gleichspannung und Oszillogramme sind gegen Gerätemasse zu messen.
  AUSNAHME
  Beim Netzteil sind die Gleichspannungen und Oszillogramme auf der Primärseite gegen Live GND gemessen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen. Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile in dem Gerät, ungeachtet der etwaigen Typenbezeichungen.

## Avertissements

- Les normes de sécurité exigent qu'aprés réparation l'appareil soit remis dans son état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.

  Les composants de sécurité sont marqués ⚠

- Tout les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharger statiques (ESD). Leur longévité pourrait étre considérablement écourté par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations s'assurer de bien étre relié au méme potential que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.
- Toujours alimenter un appareil à réparer à travers un transfo d'isolement.
- Ne jamais remplacer les modules ni d'autres composants quand l'appareil est sous tension.
- Pour l'ajustage, utiliser des outils en plastique au lieu d'instruments métalliques. Ceci afin d'éviter les court-circuits et exclure l'instabilité dans certains circuits.

### Observations

- La mésure des tensions continues et des oscillogrammes doit se faire par rapport à la terre de l'appareil.
  EXCEPTION
  Sur l'unité d'alimentation la tension continue et l'oscillogramme sont mesurés sur le côte primaire en Live GND.
- La mésure des tensions continues et des oscillogrammes figurant sur le schéma doit se faire dans un signal de barre couleur porteuse image sur 503.25 MHz (C25).
- Les oscillogrammes et tension sont mésurées en mode RECORD ou PLAY.
- Les semi-conducteurs indiqués dans le schéma de principe et à la liste des compostants, sont interchangeables par repère sur ce chassis avec les semi-conducteurs de l'appareil quelle que soit la désignation de type donnée sur ces semi-conducteurs.

## Veiligheidsinstructies

- Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indentiek aan de oorspronkelijke, worden toegepast.

  De veiligheidsonderdelen zijn aangeduid met het symbool ⚠

- Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.
- Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.
- Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.
- Gebruik voor het afregelen plastic i.p.v metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

### Opmerkingen

- De gelijksspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.
- De gelijksspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beelddraaggolf op 503.25 MHz (C25).
- De oscillogrammen en gelijksspanningen zijn in RECORD of PLAY mode gemeten.
- De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

## Avvertimenti

- Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali.

  Componenti di sicurezza sono marcati con ⚠

- Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Noncuranze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.
- Apparecchi da riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.
- Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.
- Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Cosí si evitano cortocircuiti e collegamenti instabili.

### Osservazioni

- Misurare le tensioni continue e gli oscillogrammi riferiendosi alla massa dell'apparecchio.
  ECCEZIONE
  Le tensioni continue e gli oscillogrammi dall'alimentatore sono misurati sulla parte primaria contro GND-Live.
- Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).
- Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.
- I componenti indicati nelle liste sono intercambiabili con quelli nell'apparecchio nonostante l'eventuale denominazione di modelli.

## Avisos

- Las instrucciones de seguridad exigen que después de la reparación el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.

  Los componentes de seguridad estan marcados con ⚠

- Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores en caso de reparación, podría llevar a la destrucción de estos componentes, o a una reducción drástica de la duración. Tenga cuidado de que, en caso de reparación, estar al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.
- Para reparar un aparato hay que conectarlo siempre a la alimentación a traves de un transformador de aislamiento.
- Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.
- Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitaran cortocircuitos y circuitos inestables.

### Notas

- Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.
  UITZONDERING:
  Bij het netgedeelte zijn de gelijkspanningen en oscillogrammen aan de primaire kant tegen Live GND gemeten.
- Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de manera siguiente: señal barra de color portadora de imagen en 503.25MHz (C25)
- Los oscilogramas y las tensiones continuas son medidas en „RECORD" y „PLAYBACK"
- Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

# OPERATING INSTRUCTIONS

1. **INSTALLATION** ............ **1-11**

Connecting to theTV-set ............ 1-11
AutomaticTV Channel Search ............ 1-11
AutomaticTV ChannelAllocation (FOLLOWTV) ............ 1-12
Connecting a decoder or additional equipment ............ 1-12
ManualTV Channel Search ............ 1-12
Monitor function ............ 1-13
Sort/ClearTV Channels manually ............ 1-13
Setting the language ............ 1-13
Setting the clock and the date ............ 1-13
User guide (OSD) ............ 1-13
Emergency interrupt ............ 1-14
Saving energy ............ 1-14

2. **PLAYBACK** ............ **1-14**

Playback a cassette ............ 1-14
Searching for tape position ............ 1-14
The JOG/SHUTTLE functions ............ 1-14
Selecting the picture setting (SMART PICTURE) ............ 1-15
Eliminating picture interference ............ 1-15

3. **MANUAL RECORDING** ............ **1-16**

Recording with/without automatic switch-off ............ 1-16
Automatic recording from a satellite receiver (SAT RECORDING) ............ 1-16
Direct Record ............ 1-16

4. **AUTOMATIC (PROGRAMMED) RECORDING** ............ **1-17**

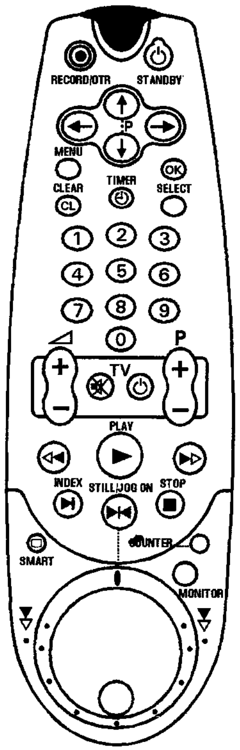
'VPS' (Video Programming System) / 'PDC' (Programme Delivery Control) ............ 1-17
Programming with 'SHOWVIEW' ............ 1-17
Manual recording without 'SHOWVIEW' ............ 1-18
How to check or alter aTIMER ............ 1-18
'NexTView Link' ............ 1-18

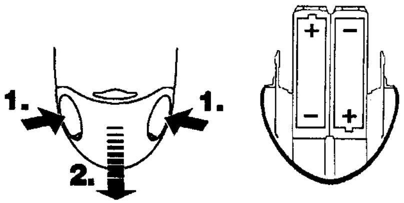
5. **ADDITIONAL FUNCTIONS** ............ **1-19**

Changing theTV system ............ 1-19
Child lock ............ 1-19
Switching the remote control command ............ 1-19
Continuous playback ............ 1-19
The automatic switch-off ............ 1-20
Remote control ofTV sets ............ 1-20
Audio dubbing ............ 1-21
Selecting the sound track ............ 1-21
Synchronous editing (synchro-edit) ............ 1-21

# OPERATING INSTRUCTIONS IN BRIEF

## The remote control



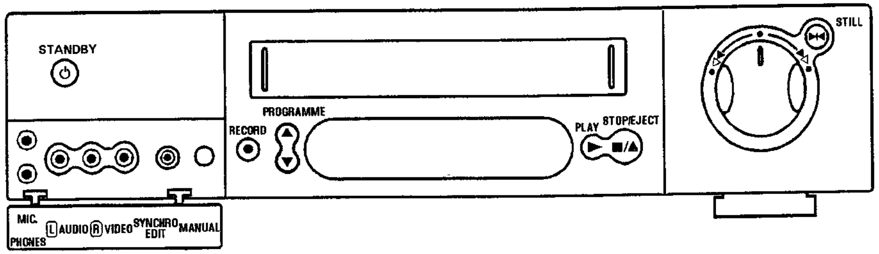


| | |
|---|---|
| ●RECORD/OTR | **Record/OTR:** Direct recording of the programme selected at this moment |
| ⏻STANDBY | **Switch off** : Switch off set, interrupt menu function, interrupt TIMER-recording |
| P↑ | **Programme/Menu button:** Programme number plus/Cursor up |
| P↓ | **Programme/Menu button**: Programme number minus/Cursor down |
| ← | **Menu button**: Cursor left |
| → | **Menu button**: Cursor right |
| MENU | **Menu button:** Call up main menu/End |
| OK | **Store/Confirm:** Store/Confirm entry |
| CLEAR (CL) | **Delete:** Delete last entry/Clear TIMER |
| TIMER ⏻ | **TIMER:** Manual TIMER programming or alter/clear a programmed TIMER |
| SELECT | **Select:** Function selector |
| 0-9 | **Digit buttons:** 0 - 9 |
| ◁◀ | **Rewind** : During STOP and STANDBY: rewind, during PLAYBACK: reverse scanning |
| PLAY ▶ | **Playback** : Playback a recorded cassette |
| ▶▷ | **Forward wind:** During STOP and STANDBY: forward wind, during PLAYBACK: forward scanning |
| INDEX ▶I | **Index search:** In combination with ◁◀ / ▶▷ , search for previous/next recording-index on the tape |
| STILL/JOG ON ▶◀ | **Still picture/JOG on:** Stop the tape and display the actual position on the tape as a still picture/switch on the 'JOG' function |
| STOP ■ | **Pause/Stop:** Stop the tape, except during TIMER-recording |
| SMART ▢ | **SMART:** Adjust the picture setting during playback |
| COUNTER | **Counter:** Select display of tape positon |
| MONITOR | **TV monitor** : Switch between TV reception and VCR playback |
| -⊙+ | **SHUTTLE** : During STILL, select picture search speed with the outer dial (shuttle) |
| ⊙ | **JOG** : During STILL picture, select single picture with the inner dial (jog) |

**Additional TV-function**

| | |
|---|---|
| ◢ +/− | **TV volume:** TV volume up/down |
| TV ⏻ | **Switch off** : Switch off TV |
| TV 🔇 | **TV sound off** : Switch off/on sound completely |
| P +/− | **TV Programme:** TV programme number up/down |

## Front of the set

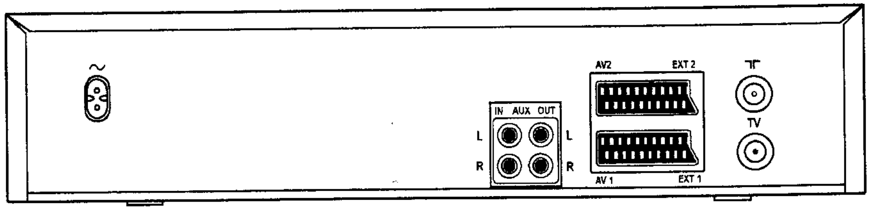


| | |
|---|---|
| STANDBY ⏻ | **Standby** : Switch off, interrupt function, interrupt TIMER recording |
| RECORD ● | **Record**: Record the programme selected at this moment |
| PROGRAMME ↑ | **Programme number Plus**: Programme number up |
| PROGRAMME ↓ | **Programme number Minus**: Programme number down |
| PLAY ▶ | **Playback** : Playback a recorded cassette |
| STOP/EJECT ■/▲ | **Pause/Stop**: Stop the tape, except during TIMER-recording |
| STILL ▶◀ | **Still picture**: Stop the tape and display the actual position on the tape as a still picture |
| -⊙+ | **Rotary control**: turn left: during STOP and STANDBY: rewind, during PLAYBACK: reverse scanning<br>turn right: during STOP and STANDBY: wind, during PLAYBACK: forward scanning |

**Behind the flap at the lefthand corner on the front:**

| | |
|---|---|
| MIC. | **Microphone input socket**: To connect a microphone for dubbing (programme number 'MIC') |
| PHONES | **Headphones socket**: To connect headphones |
| L-AUDIO-R | **Audio input socket left/right** : To connect a camera recorder or video recorder (programme number 'E3') |
| VIDEO | **Video input socket** : To connect a camera recorder or video recorder ('E3') |
| SYNCHRO EDIT | **EDIT input socket** : To connect a suitable camera recorder |
| MANUAL | **Manual sound control** : To switch between automatic sound control and manual sound control |

## Back of the set



| | |
|---|---|
| ~ | **Mains socket**: To connect the mains cable |
| AUX IN L R | **Audio input socket, left/right** : To connect a HiFi-set (programme number 'AUX') |
| AUX OUT L R | **Audio output socket, left/right** : To connect a HiFi-set. |
| AV2 EXT2 | **Scart socket 2**: To connect a satellite receiver, decoder, video recorder, etc. (programme number 'E2'). |
| AV1 EXT1 | **Scart socket 1**: To connect the TV set (programme number 'E1'). |
| ┐┌ | **Aerial input socket**: To connect the aerial cable |
| TV | **Aerial output socket**: To connect the TV set |

# 1. INSTALLATION

## Connecting to the TV-set

When you install your Video recorder for the first time, please read:

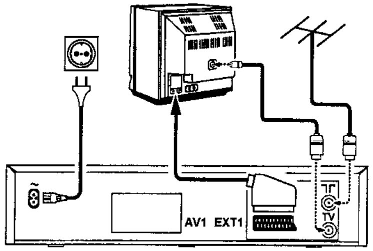
☐ the paragraph 'Connecting with scart cable and Easy Link/NexTView', when your TV-set is equipped with 'Easy Link/NexTView'.

☐ the paragraph 'Connecting with scart cable without Easy Link/NexTView', when your TV-set is not equipped with 'Easy Link/NexTView'.

☐ the paragraph 'Connecting without a scart cable', when you do not use a scart cable.

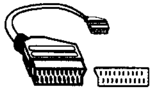
## Connecting with scart cable and 'Easy link/NexTView'

With the function 'Easy Link/NexTView', your video recorder can exchange information with the television. Heed the operating instruction of your television.
With 'Easy Link/NexTView' the TV channels from the TV will automatically be loaded.

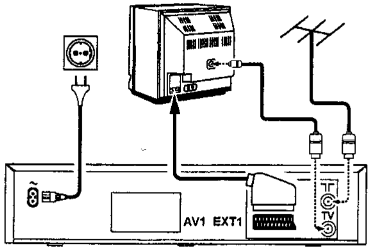


1. Remove the aerial cable plug from your TV set and insert it into the [⊤⊤] socket at the back of the video recorder.
2. Plug one end of the aerial cable provided into the [TV] socket on the video recorder and the other end into the aerial input socket on your TV set.
3. Plug one end of the special scart cable provided into the [AV1 EXT1] scart socket at the back of the video recorder and the other end into the scart socket on your TV set.
4. Switch on the TV set.
5. Insert one end of the mains cable into the mains socket [~] at the back of the video recorder and the other end into the wall socket.
6. The video recorder will automatically load all TV channels stored on your TV, in the same sequence.
   This may take several minutes.
   When all data (TV channels, language, country) has been copied, the following text appears on the TV screen: 'EASY LINK LOADING COMPLETE'.
7. Check if clock and date are correct. Read the paragraph 'Setting Time/Date' in this chapter.

## Connecting with scart cable without 'Easy Link/NexTView'

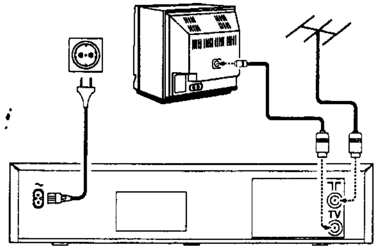


If your television **does not have a scart (EURO-AV) socket**, please **do not read further here**, but turn to the next paragraph 'Connecting without scart cable'.

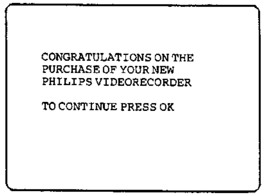


1. Remove the aerial cable plug from your TV set and insert it into the [⊤⊤] socket at the back of the video recorder.
2. Plug one end of the aerial cable provided into the [TV] socket on the video recorder and the other end into the aerial input socket on your TV set.
3. Plug one end of the scart cable into the scart socket [AV1 EXT1] on the back of the video recorder and the other end into the scart socket on your TV set.
4. Switch on the TV set.
5. Insert one end of the mains cable into the mains socket [~] at the back of the video recorder and plug the other end into the wall socket.
6. When your TV set **automatically switches** to programme number e.g.: 'EXT', '0', or 'AV', a welcoming text appears on the TV screen.
   When your TV set does not switch automatically, select the required programme number manually (see instruction manual TV set).
7. Subsequently, read the paragraph 'Initial Installation' in the section 'Automatic TV Channel Search'.

## Connecting without scart cable



1. Remove the aerial cable plug from your TV set and insert it into the [⊤⊤] socket at the back of the video recorder.
2. Plug one end of the aerial cable provided into the [TV] socket on the video recorder and the other end into the aerial input socket on your TV set.
3. Insert one end of the mains cable into the mains socket [~] at the back of the video recorder and plug the other end into the wall socket.
4. Switch on your TV set and select the programme number that you have chosen for video playback (see operating manual for your TV set).
5. The video recorder will now send a welcoming text on UHF-channel CH36or 591MHz.
6. Tune in the TV set in the UHF wave band until this picture appears.



CONGRATULATIONS ON THE
PURCHASE OF YOUR NEW
PHILIPS VIDEORECORDER

TO CONTINUE PRESS OK

7. Subsequently, read the paragraph 'Initial Installation' in the section 'Automatic TV Channel Search'.

## Automatic TV Channel Search

### Initial installation

1. Press the [OK] button.
2. Select your language with the menu buttons [P↓] or [P↑] and confirm with the [OK] button.
3. Select your country with the menu buttons [P↓] or [P↑]. If your country is not displayed, select 'OTHERS'. Confirm with the [OK] button.
4. If the aerial has been connected to the video recorder, press the [OK] button.
   'Automatic TV Channel Search' starts.
5. When all TV channels have been found, 'AUTOMATIC SEARCH COMPLETE' appears on the TV screen.

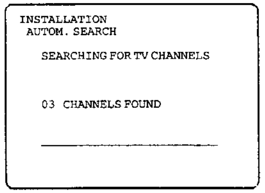
☐ 'TIME', 'YEAR', 'MONTH', 'DATE' appear on the TV screen.

6. If required, adjust 'TIME', 'YEAR', 'MONTH', 'DATE' with the digit buttons [0-9]. To select between the fields, use the menu butons [P↓] or [P↑]. Confirm each entry with the [OK] button.
7. To end, press the [MENU] button.

How to search for a TV channel manually, you can read in 'Manual TV Channel Search'.

## Successive Installation

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'AUTOM. SEARCH' with the [P↓] or [P↑] menu button.
5. Press the [→] button. The 'Automatic TV Channel Search' starts.



```
INSTALLATION
 AUTOM. SEARCH

   SEARCHING FOR TV CHANNELS


   03  CHANNELS FOUND

   ______________________________
```

6. When the TV channel search is complete, 'AUTOMATIC SEARCH COMPLETE' will appear on the screen.
7. To end, press the [MENU] button.

How to search for a TV channel manually, you can read in the section 'Manual Channel Search'.

## Automatic TV Channel Allocation (FOLLOW TV)

With this function the video recorder maintains the same channel sequence as on the TV set, in case you connected your videorecorder to a TV set **without scart cable**. This only functions if the video recorder (socket [AV1 EXT1]) and the TV set are **connected with a scart cable**. Additional equipment connected to socket [AV2 EXT2] must be **switched off**.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View', this function will start the data transfer.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'FOLLOW TV' with the menu buttons [P↓] or [P↑] and confirm with the [→] button. Take notice of the message on the TV screen.
5. Press the [OK] button.
   If the video recorder recognizes that the TV set has been connected with a scart cable, 'TV' 01' appears in the display.

☐ When 'NOTV' (no signal from TV set) appears in the display, the TV channels can not be allocated automatically. In this case, read paragraph: 'Manual TV Channel Number Allocation'.

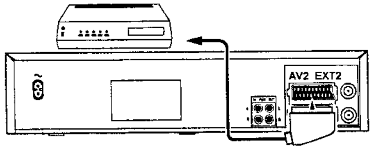
6. Select programme number '1' **on the TV set**.
7. Confirm with the [OK] button on the video recorder-remote control. The video recorder compares the TV channels on the TV set and the video recorder.
   If the video recorder found the same TV channel as the TV set, then it stores it at 'P01'.
8. Wait until e.g.: 'TV' 02' appears.
9. Select the next programme number, e.g.: '2' **on the TV set**.
10. Confirm with the [OK] button on the video recorder-remote control.

▷ If you allocated the wrong TV channeL, you can go back one step with the menu button [←].

11. Repeat steps [8] to [10] until all TV channels have been allocated.
12. To finish, press the [MENU] button.

## Connecting a decoder or additional equipment

You can also connect additional equipment to the [AV2 EXT2] socket. For instance: decoder, satellite receiver or camera recorder.
You can connect a HIFI-stereo set to the sockets [AUX OUT L R] (audio output left/right) and [AUX IN L R] (audio input left/right).



## Allocating a decoder

With this function, the connected decoder will automatically be activated for the TV programme required.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View' the decoder must be activated for the TV set.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. On the video recorder, select the TV programme you wish to link with the decoder function, using the [P↑] or [P↓] button or the digit buttons [0-9].
3. Press the [MENU] button. The main menu appears.
4. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
5. Select the line 'MANUAL SEARCH' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
6. Select the line 'DECODER' with the menu buttons [P↓] or [P↑].
7. Select function 'ON' with the menu buttons [←] or [→]. When you select 'OFF', the function will be switched off.
8. Confirm with the [OK] button.

▷ When the function is switched on, 'DEC' appears in the display.

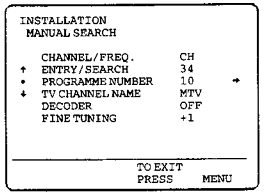
9. To end, press the [MENU] button.

## Manual TV Channel Search

In certain cases the 'Automatic TV Channel Search' may not be able to find all of the TV channels (e.g. coded TV channels). In that case, use this manual method to set the channels.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View' the videorecorder automatically loads the TV channels from the TV set. Hence, some lines are not functional.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].
4. Select the line 'MANUAL SEARCH' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].



```
INSTALLATION
 MANUAL SEARCH

   CHANNEL/FREQ.        CH
↑  ENTRY/SEARCH         34
•  PROGRAMME NUMBER     10      →
↓  TV CHANNEL NAME      MTV
   DECODER              OFF
   FINE TUNING          +1

_________________________________________
                  TO EXIT
                  PRESS      MENU
```

5. In the line 'CHANNEL/FREQ.', select the display for:
   **'FREQ.'**: frequency
   **'CH'**: channel
   **'S-CH'**: special channel
6. If you know the frequency or channel of the desired TV channel, you can enter the data in line 'ENTRY/SEARCH' with the digit buttons [0-9].

☐ If you don't know the frequency or channel of the TV channel of your choice, press the menu button [→] to start the channel search.

7. In the line 'PROGRAMME NUMBER' select the programme number you want e.g.: '01', using the menu buttons [←] or [→].
8. If you want to change the TV channel name, press the [→] button in line 'TV CHANNEL NAME'.

☐ Select the character you want to change with the [←] or the [→] button. Change the character with the [P↓] or the [P↑] button. Select the next character in the same way.

☐ Keep pressing the menu button [→] until the cursor disappears.

9. If you want to change the automatic tv channel setting, select the line 'FINE TUNING'.
   With the menu buttons [←] or [→] you can vary the automatic tv channel setting. **Important:** This re-tuning is only necessary and useful in **special cases**, e.g.: when there are stripes on the picture with cable-TV systems.
10. Press the [OK] button to store the TV channel.
11. If you want to search for further TV channels, start again at step [6].
12. To end, press the [MENU] button.

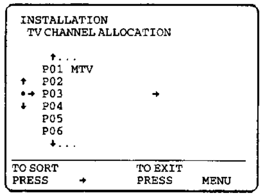
## Monitor function

You can switch back and forth between TV reception and video recorder reception with the [MONITOR] button. This only functions when you used a scart cable to connect the video recorder to your TV set and if your TV set responds to this switch-over.

## Sort/Clear TV Channels manually

▷ With 'Connecting with Easy Link/NexTView' the video recorder automatically loads the TV channels from the TV set. Hence, you can not select this function.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'TV CHANNEL ALLOCATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.



```
INSTALLATION
 TV CHANNEL ALLOCATION

    ↑...
   P01  MTV
↑  P02
•→ P03                 →
↓  P04
   P05
   P06
    ↓...

TO SORT               TO EXIT
PRESS    →            PRESS      MENU
```

5. With the menu buttons [P↓] or [P↑], select the TV channel to which you want to allocate a programme number (starting with 'P01' and press the [→] button.

▷ If you want to delete a TV channel, press the [CLEAR (CL)] button.

6. With the menu buttons [P↓] or [P↑], shift the TV channel to the programme number you wish to allocate to this TV channel and press the [←] button. The TV channel will *be added.*
7. *Repeat steps [5] to [6] until you have allocated a* programme number to all TV channels.
8. To store, press the [OK] button.
9. To end, press the [MENU] button.

## Setting the language

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'LANGUAGE' and confirm with the [→] button.
5. Select your language with the [P↓] or [P↑] menu button and confirm with the [OK] button.
6. To end, press the [MENU] button.

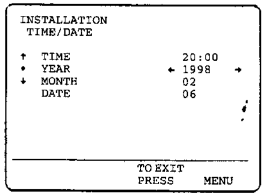
## Setting the country

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'COUNTRY' and confirm with the [→] button.
5. Select your country with the menu buttons [P↓] or [P↑]. If your country doesn't show up, select 'OTHERS'.
6. Confirm with the [OK] button.
7. To end, press the [MENU] button.

## Setting the clock and the date

If the time in the video recorder display is not correct or if '--:--' appears in the display, please set the clock manually.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the [MENU] button. The main menu appears.
3. Select the line 'INSTALLATION' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.
4. Select the line 'TIME/DATE' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.



```
INSTALLATION
 TIME/DATE

↑   TIME              20:00
•   YEAR            ← 1998     →
↓   MONTH             02
    DATE              06

                  TO EXIT
                  PRESS      MENU
```

5. Adjust 'TIME', 'YEAR', 'MONTH', 'DATE' if required, using the digit buttons [0-9]. Switch between fields with the menu buttons [P↓] or [P↑].
6. Confirm each entry with the [OK] button.
7. To end, press the [MENU] button.

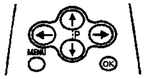
▷ If a TV channel which transmits TXT/PDC is stored with programme number 'P01', time (from TXT) and date (from PDC) will automatically be taken from the TXT/PDC information.

## User guide (OSD)

With OSD (On Screen Display) the corresponding functions appear on the TV screen as a menu. The most important button-functions are displayed at the bottom of the screen.

- ☐ **Call up the menu:** With the [MENU] button.
- ☐ **Select a line:** With the [P↓] or [P↑] button.
- ☐ **Select within a line:** With the menu buttons [←] or [→].

- ☐ **Enter/Alter:** With the ← or → or with the 0-9 button.
- ☐ **Store:** With the OK button.
- ☐ **Confirm:** With the menu button →.
- ☐ **Exit menu:** With the MENU button.



## Emergency interrupt

Both the video recorder and the remote control have an 'Emergency interrupt' button. You can use the ⏻STANDBY button to interrupt any function.
Whenever you have operating problems you can simply interrupt the function and start again.
You can practise operating your set without any worries. No matter which buttons you press, you cannot damage it.

## Important notes for operation

- ☐ You can switch on with the STOP■ button, the 0-9 buttons or by inserting a cassette.
- ☐ Keep your video recorder connected to the mains at all times to ensure that programmed recordings can be made and that the television functions normally. The power consumption required is less than 4W (saving energy mode).
- ☐ When the video recorder is disconnected from the mains, TV channels will be strored typically 1 year, and clock/timer data will be stored typically 7 hours.

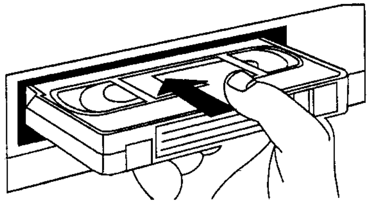
## Saving energy

You can choose between two methods of switching to standby.
**Normal method:** Switch to standby using the ⏻STANDBY button. The clock time remains displayed.
If the clock has not been set, '--:--' appears.
**To save energy:** Press the ⏻STANDBY button twice. The clock time disappears from the display.

# 2. PLAYBACK

## Playback a cassette

1. Insert a cassette into the cassette slot.



2. Press the PLAY► playback button.
3. To stop, press the STOP■ button.
4. To eject, Press the STOP/EJECT■/▲ button on the set.

▷ Some hired cassettes may have a poor picture/sound quality. This is not a fault in your set. Please read the section 'Selecting the picture setting (SMART PICTURE)', or 'Eliminating picture interference'.

▷ Some functions switch off automatically after a while (e.g.: Pause, Still Picture, Scanning). This helps to protect the cassette and prevent unnecessary power consumption.

## NTSC Playback

With this set you can playback cassettes that have been recorded on another video recorder in the NTSC standard. This only works for PAL-television sets which are suitable for a picture frequency of 60 Hz.
During NTSC playback '60HZ' appears in the display.

▷ During NTSC-playback some special features (e.g. still picture) are not possible.

## Tape position indication

1. During playback press the COUNTER button.
2. Select one of the following obtions:
   **'TIME USED'** to indicate the time used on the tape
   **'TIME LEFT'** to indicate the time left on the tape
   **'COUNTER'** to indicate the actual position on the tape

▷ With the OK button, you can superimpose the actual tape position on the TV screen.

## Searching for tape position with picture (picture search)

1. During playback, press the ◄◄ (reverse) or ►► (forward) button once or several times.
2. To interrupt at the position required, press the PLAY► button.

▷ During picture search, the picture quality is affected and the sound is turned off.

## The JOG/SHUTTLE functions

You will find a large rotary knob (Shuttle) -⊙+ both on the video recorder and the remote control.

1. Switch the function on with the STILL►I◄ button.
   You will see a still picture.
2. Use the inner JOG disc on the remote control to select the next or previous still picture.
3. Turning the inner disc continuously to the right or to the left switches to slow motion, forward or reverse.
4. The outer SHUTTLE ring enables you to select different tape speeds for the forward or reverse picture search.

## Searching for tape position without picture (wind/rewind)

1. Stop the tape with the STOP■ button.
2. Press the ◄◄ (reverse) or ►► (forward) button. If you want to carry out this function on your video recorder, turn the outer rotary control (Shuttle) -⊙+ to the left or to the right.
3. To interrupt at the position required, press the STOP■ button.

## Quick View

With this function you can switch to picture search during wind/rewind.

1 If you hold the ◀◀ (rewind) or ▶▶ (wind) button during wind or rewind, you will switch to picture search.

2 If you release the button, the video recorder will automatically switch back to rewind or wind.

## Automatic search for tape position (Index search)

At the beginning of each recording, the video recorder marks the tape with a index code mark.

1 Press the INDEX▶| button. Then press the ▶▶ button to select the next code mark or the ◀◀ button for the previous code mark.

2 When the video recorder finds the code mark or a blank space it will automatically switch to playback.

▷ You can only search for a blank space with recordings made on a video recorder that does not have this index code mark function.

## Selecting the picture setting (SMART PICTURE)

During playback, you can change the picture setting:

1 During playback, press the SMART▢ button. The current selection will be shown.

2 Press the SMART▢ button repeatedly to select the required picture setting.

3 Confirm the new setting with the OK button.

This picture setting will remain until you eject the cassette.

## Eliminating picture interference

*When the picture quality is poor, please proceed as follows:*

## Tracking during playback

1 During playback, press the MENU button.

2 Select the line 'PLAY FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the → button.

3 Select the line 'MANUAL TRACKING' with the menu buttons P↓ or P↑.

4 Hold the menu buttons ← or → until the playback quality is at its best.

5 Confirm with the OK button.

6 To end, press the MENU button. This setting will remain until you remove the cassette.

## Tracking during still picture

If the still picture vibrates vertically, you can improve the still picture as follows:

1 During still picture, press the MENU button.

2 Select the line 'PLAY FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the → button.

3 Select the line 'VERTICAL STABILITY' with the menu buttons P↓ or P↑.

4 Hold the menu buttons ← or → until the picture quality is at its best.

5 Confirm with the OK button.

6 To end, press the MENU button.

## Cleaning the video heads

1 During playback, press the MENU button.

2 Select the line 'PLAY FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the → button.

3 Select the line 'HEAD CLEANING' with the menu buttons P↓ or P↑.

4 Press the OK button. 'HEAD CLEANING IN PROGRESS' appears on the screen.

5 Wait a few seconds, until the message disappears and then press the MENU button.

# 3. MANUAL RECORDING

## Recording without automatic switch-off.

1. Insert a cassette.
2. Use the P↑ or P↓ button to select the programme number (programme name) from which you wish to record.

▷ When the function 'Direct record' is switched on, select the programme number on the TV set. With the video recorder **switched on**, press the ●RECORD/OTR button.

▷ When a TV channel transmits a channel name, it will show in the display.

▷ Programme numbers 'E1' and 'E2' are provided for recording from external sources (via scart sockets AV1 EXT1 and AV2 EXT2). Programme number 'E3' is provided for recording from the front sockets VIDEO and L-AUDIO-R.

▷ Programme numbers 'AUX' and 'MIC' are provided for audio recordings (via sockets AUX IN L R) and the microphone socket 'MIC.'.

3. Press the ●RECORD/OTR button.
4. Stop recording with the STOP■ button.

## Recording with automatic switch-off (OTR One-Touch-Recording)

1. Insert a cassette.
2. Use the P↑ or P↓ button to select the programme number (programme name) from which you wish to record.
3. Press the ●RECORD/OTR button.
4. Press the ●RECORD/OTR button repeatedly to obtain the required end time or length of the recording.

▷ To cancel this entry, press the CLEAR (CL) button.

## Erase protection

So that you don't accidentally delete an important recording, remove the special tab (erase protection) on the narrow side of the cassette with a screwdriver or slide the special tab to the left. Later, if you no longer want the cassette to be erase protected, you can seal the gap again with adhesive tape or slide the special tab to the right.

## Auto-assembling

You can use the auto-assembling function to join individual recordings without any major picture disturbance between the recordings.

1. During playback, search for the correct position on the tape.
2. Stop playback by pressing the STOP■ button. 'PAUSE' appears on the TV screen.
3. Now start recording as usual by pressing the ●RECORD/OTR button.

## Selecting the recording speed (SP/LP)

You can reduce the recording speed by half. This makes it possible to record, for example, 8 hours instead of 4 hours on an 'E240' (4 hour) cassette.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the MENU button. The main menu appears.
3. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑, and confirm with the → button.
4. Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑, and confirm with the → button.
5. Select the line 'RECORD SPEED' with the menu buttons P↓ or P↑.
6. Select the required recording speed with the menu buttons ← or →.

▷ **'LP'**: Long Play = half recording speed (double recording time).
**'SP'**: Standard Play = normal recording speed.

▷ The picture quality will be adversely affected when recording at half recording speed ('LP').

▷ For playback, the correct recording speed will automatically be selected.

7. Confirm with the OK button.
8. To end, press the MENU button.

## Automatic recording from a satellite receiver (SAT RECORDING)

You can only use this function, when you have a satellite receiver, which can control other equipment by a 'programming' function.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the MENU button. The main menu appears.
3. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑, and confirm with the → button.
4. Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑, and confirm with the → button.
5. Select the line 'SAT RECORD' with the menu buttons P↓ or P↑.
6. Select the required scart socket 'E1' or 'E2' with the menu buttons ← or →.
   If you want to switch off the function, select 'OFF' with the menu buttons → or ←.
7. Confirm with the OK button.
8. Use a scart cable to connect the scart socket you selected on the video recorder (AV1 EXT1 or AV2 EXT2) to the corresponding scart socket on the satellite receiver.
9. Insert a cassette.
10. To end, press the ⏻STANDBY button. The video recorder is now prepared for recording. The start and end of the recording is controlled via one of the scart sockets.

▷ When this function is switched on, '📡' appears in the display.

## Direct Record

With this function switched on, and the video recorder **switched to standby**, the video recorder automatically takes the channel number which is currently selected on the television when it starts recording, by means of the scart cable.

▷ With 'Connecting with scart cable and 'Easy Link/NexT-View', the video recorder also takes the programme number from the TV set automatically with the video recorder switched on.

1. Switch on the TV set. If required, select the programme number for the video recorder.
2. Press the MENU button. The main menu appears.
3. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑, and confirm with the → button.
4. Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑, and confirm with the → button.
5. Select the line 'DIRECT RECORD' with the menu buttons P↓ or P↑.
6. Select the function 'ON' with the menu buttons ← or →. If you select 'OFF', the function will be switched off.
7. Confirm with the OK button.
8. To end, press the MENU button.
9. Switch off with the ⏻STANDBY button.
10. On the TV set, select the programme number you want make the recording from.
11. Press the ●RECORD/OTR button with the video recorder **switched off**.

▷ Don't select another programme number on your TV set, until the 'search symbol' in the display of your video recorder disappears. This can take up to one minute.

▷ When 'NOTV' appears in the display, the programme number could not be found. The video recorder switches off automatically.

# 4. AUTOMATIC (PROGRAMMED) RECORDING

The video recorder needs the following information for every programmed recording:

* the date on which the recording is to be made
* the programme number for the TV channel
* the start and stop time of the recording
* VPS/PDC on or off
* the recording speed (SP/LP)

The video recorder stores all the information mentioned above in a TIMER block. You can programme up to 6 TIMER blocks, one month in advance.

## 'VPS' (Video Programming System) / 'PDC' (Programme Delivery Control)

With 'VPS/PDC', the TV station controls the beginning and the length of the programmed recording. This means that the video recorder switches itself on and off at the **right time** even if a TV programme you have programmed begins earlier or finishes later than expected.
Usually the start time is the **same** as the VPS/PDC time. If, however, in the TV guide, in addition to a TV programme's start time, a different VPS/PDC time is given, e.g.: '20.15 (VPS 20.14)', you must enter '20.14' as the start time **exactly to the minute.**
If you want to enter a time that differs from the VPS/PDC time, you must switch off 'VPS/PDC'.

## Programming with 'SHOWVIEW'

All the information required for a programming is contained encoded in the SHOWVIEW code.

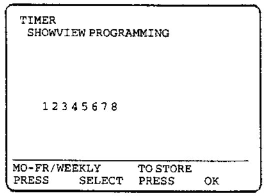
SHOWVIEW

1. Switch on the TV set. If required, select the programme number for the video recorder.

2. Press the [TIMER ⏲] button on the remote control. The programme mode selected last is marked.

3. Select the line 'SHOWVIEW' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

4. Enter the entire SHOWVIEW-code (up to 9 digits) printed in your TV guide next to the start time of a TV programme. If you made a mistake, clear the entry with the [CLEAR (CL)] button.



```
TIMER
 SHOWVIEW PROGRAMMING


   12345678


MO-FR/WEEKLY      TO STORE
PRESS    SELECT   PRESS     OK
```

5. Select programming at daily or weekly intervals with the [SELECT] button.
**'MO-FR'**: recording at daily intervals from Mondays to Fridays inclusive.
**'WEEKLY'**: recording at weekly intervals on the same day of the week.

6. Confirm with the [OK] button. The TIMER data will now appear on the TV screen.

▷ If SHOWVIEW does not recognize the TV channel, 'PLEASE ENTER PROGRAMME NUMBER' appears on the TV screen. Select the required programme number (programme name) with the [P↑] or the [P↓] button. Confirm with the [OK] button.

▷ If 'SHOWVIEW CODE WRONG' appears on the TV screen, you entered an incorrect code number or the incorrect date. Repeat the entry or end with the [TIMER ⏲] button.

▷ If 'WEEKEND PROGRAMMING - NOT POSSIBLE' appears on the TV screen, the date was incorrectly entered. 'Daily' programming can only be used for recordings to be made from Mondays to Fridays inclusive.

▷ Use the [SELECT] button to switch 'VPS/PDC' on or off in 'START'.

▷ Use the [SELECT] button to select the recording speed 'SP' or 'LP' in 'END'.

7. Confirm with the [OK] button.

▷ The data has been stored in a TIMER block.

8. To end, press the [TIMER ⏲] button.

9 Please note that you inserted a cassette without erase protection. Switch off with the ⏻STANDBY button.
The programmed recording will only function when the video recorder is **switched off** with the ⏻STANDBY button.

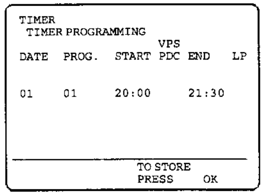
- ▷ If one or more of the TIMER blocks are occupied, '⏱' lights up in the display.
- ▷ If the end of the cassette is reached during a recording, the cassette will automatically be ejected.
- ▷ If you forget to load a cassette, 'NO CASSETTE' appears on the TV screen and '⏱' lights up in the display.
- ▷ If you inserted a cassette with erase protection when you want to start a recording, the cassette will be ejected.
- ▷ Programme numbers 'E1' and 'E2' are provided for external recordings (via scart socket AV1 EXT1 or AV2 EXT2).
- ▷ Programme number 'AUX' and 'MIC' are provided for audio recordings (via sockets AUX IN L R) and the microphone socket 'MIC.'.

## Manual recording without 'SHOWVIEW'

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER⏱ button on the remote control.
The programming mode selected last is marked.

3 Select the line 'TIMER PROGRAMMING' with the menu buttons P↓ or P↑ and confirm with the → button.



```
TIMER
 TIMER PROGRAMMING
                        VPS
DATE   PROG.   START   PDC  END     LP

01     01      20:00        21:30

                       TO STORE
                       PRESS      OK
```

4 Select the entry field with the menu buttons ← or →.

5 Enter data with the menu buttons P↓ or P↑ or with the digit buttons 0-9.

- ▷ Select recording at daily or weekly intervals in the field 'DATE', with the SELECT button.
**'MO-FR'**: Recording to be made from Mondays to Fridays inclusive.
**'MO'**: Weekly recordings on the same weekday.
- ▷ Use the SELECT button to switch 'VPS/PDC' on or off in 'START'.
- ▷ Use the SELECT button to select the recording speed 'SP' or 'LP' in 'END'.

6 Confirm with the OK button.

- ▷ The data has been stored in a TIMER block.

7 To end, press the TIMER⏱ button.

8 Please note that you inserted a cassette without erase protection. Switch off with the ⏻STANDBY button.
The programmed recording will only function when the video recorder is **switched off** with the ⏻STANDBY button.

- ▷ If one or more of the TIMER blocks are occupied, '⏱' lights up in the display.
- ▷ If the end of the cassette is reached during a recording, the video recorder automatically ejects the cassette. The set switches off after a few minutes.
- ▷ If you forget to load a cassette, 'NO CASSETTE' appears on the TV screen and '⏱' lights up in the display.
- ▷ If you inserted a cassette with erase protection, the cassette will be ejected.
- ▷ Programme numbers 'E1' and 'E2' are provided for external recordings (via scart socket AV1 EXT1 or AV2 EXT2).
- ▷ Programme number 'AUX' and 'MIC' are provided for audio recordings (via sockets AUX IN L R) and the microphone socket 'MIC.'.

## How to check or alter a TIMER

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER⏱ button on the remote control.
The programming mode selected last is marked.

3 Select the line 'TIMER LIST' with the menu buttons P↓ or P↑ and confirm with the → button.

4 Select the TIMER you want to check or alter with the menu buttons P↓ or P↑.

5 Press the menu button →.

6 Select what you want to check or alter data with the menu buttons ← or →.

7 Alter data with the menu buttons P↓ or P↑ or with the digit buttons 0-9.

8 Confirm with the OK button.

9 To end, press the TIMER⏱ button.

10 Please note that you inserted a cassette without erase protection. Switch off with the ⏻STANDBY button.
The programmed recording will only function when the video recorder is **switched off** with the ⏻STANDBY button.

## How to clear a TIMER

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the TIMER⏱ button on the remote control.
The programming mode selected last is marked.

3 Select the line 'TIMER LIST' with the menu buttons P↓ or P↑ and confirm with the → button.

4 Select the TIMER you want to clear with the menu buttons P↓ or P↑.

5 Press the CLEAR (CL) button.

6 Confirm with the OK button.

7 Switch off with the TIMER⏱ button.

## 'NexTView Link'

This video recorder is equipped with the function 'NexTView Link'. If your television is also equiped with this function, you can mark TV programmes on the television for programming. These TV programmes will automatically be transmitted to a TIMER block on the video recorder. If you clear the marking of the TV programme on the television, the corresponding TIMER block on the video recorder will also be cleared.
For more information, read the instruction manual of your TV set.

# 5. ADDITIONAL FUNCTIONS

## Changing the TV system

If you play back recordings made on another video recorder, the automatic TV system switch-over may lead to colour interferences.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the → button.

4 In the line 'TV SYSTEM' select the required TV system with the menu buttons ← or →.

5 Confirm with the OK button.

6 To end, press the MENU button.

▷ If colour interference still occurs, you can switch to 'B/W' (black and white) in line 'TV SYSTEM'.

## Child lock

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the → button.

4 In the line 'CHILD LOCK' select 'ON' with the menu buttons ← or →.

5 Confirm with the OK button.

6 To end, press the MENU button.
'σ-' appears in the video recorder display.
Keep the remote control in a safe place.

7 If you want to switch off the child lock, select 'OFF' in line 'CHILD LOCK'. 'σ-' disappears from the video recorder display.

▷ *If a button is pressed with activated child lock, 'σ-'* flashes in the display for a few seconds.

▷ Programmed recordings are made despite the child lock and cannot be interrupted.

You may also activate the child lock with the remote control. Press the ⏻STANDBY button on the remote control for a few seconds, until 'σ-' appears in the video recorder display. Switch the child lock off in the same way.

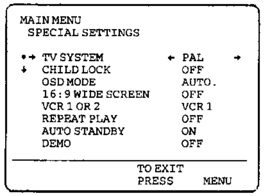
## On Screen Display (OSD)

You can switch the On Screen Display (OSD) on or off.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the → button.



```
MAIN MENU
 SPECIAL SETTINGS

•→ TV SYSTEM              ← PAL      →
↓  CHILD LOCK               OFF
   OSD MODE                 AUTO.
   16 : 9 WIDE SCREEN       OFF
   VCR 1 OR 2               VCR 1
   REPEAT PLAY              OFF
   AUTO STANDBY             ON
   DEMO                     OFF
─────────────────────────────────────
                  TO EXIT
                  PRESS       MENU
```

4 Select the line 'OSD MODE' with the menu buttons P↓ or P↑.

5 Select one of the options indicated with the menu buttons → or ←.
**'AUTO.'**: OSD appears for a few seconds each time an operating mode is selected and then disappears.
**'OFF'**: OSD is switched off.
**'ON'**: OSD is switched on.

6 Confirm with the OK button.

7 To end, press the MENU button.

▷ With the OK button you can superimpose the current operating mode on the TV screen.

## How to switch to 16:9

You can only use this function, when the video recorder (socket AV1 EXT1) and the TV set are connected with a scart cable.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the → button.

4 If you have a TV set in wide-screen format, select 'ON' in line '16:9 WIDE SCREEN'. If not, select 'OFF' with the menu buttons → or ←.

5 Confirm with the OK button.

6 To end, press the MENU button.

## Switching the remote control command

If you have two video recorders with the same remote control command, you can change the remote control command of the handset and the remote control command of one of the video recorders.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the MENU button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

4 Select the line 'VCR 1 OR 2' with the menu buttons P↓ or P↑.

5 Select 'VCR 1' or 'VCR 2' with the menu buttons ← or →

6 Confirm with the OK button.

7 On the remote control, press the SELECT button and the digit button 2 **at the same time** to switch the remote control to 'VCR 2'.

▷ If you want to switch back to 'VCR 1, press the SELECT button and the digit button 1 **at the same time**.

8 Confirm with the OK button.

▷ If the menu does not disappear, the video recorder didn't recognize the remote control command. Repeat step 7.

▷ After you changed the batteries of the remote control, it will switch back to 'VCR 1'.

▷ If you entered the wrong remote control command, the message e.g.: 'VCR ONLY RESPONDS TO VCR 1 COMMANDS' appears on the TV screen or 'VCR 1' appears in the video recorder display, when you press a button for a few seconds.

## Continuous playback

1 Press the MENU button. The main menu appears.

2 Select the line 'SPECIAL SETTINGS' with the menu buttons P↓ or P↑. Confirm with the menu buton →.

3 Select the line 'REPEAT PLAY' with the menu buttons P↓ or P↑.

4 Select 'ON' with the menu buttons ← or →. If you select 'OFF', the function will be switched off.

5 Confirm with the OK button.

6 Press the MENU button.

7 Insert a cassette and start the continuous playback with the PLAY► playback button.
When the end of the tape or the end of the recording has been reached, it rewinds and starts playback again.

## The automatic switch-off

If the video recorder is not used for a few minutes in certain modes (e.g.: STOP), it switches to standby automatically. You can switch off this automatic switch-off in order to use the video recorder as a television receiver.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Press the [MENU] button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].

4 Select the line 'AUTO STANDBY' with the menu buttons [P↓] or [P↑].

5 Select 'ON' with the menu buttons [←] or [→]. If you select 'OFF', the function will be switched off.

6 Confirm with the [OK] button.

7 To end, press the [MENU] button.

▷ A **TIMER recording** only functions when the video recorder is **switched to standby**.

## The 'DEMO' function

When the 'DEMO' function is switched on and the video recorder **switched off**, several menus will be demonstrated on the TV screen. This has no influence on operating the video recorder.

1 Switch on the TV set. If required, select the programme number for the vieo recorder.

2 Press the [MENU] button. The main menu appears.

3 Select the line 'SPECIAL SETTINGS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

4 In the line 'DEMO', select 'ON' with the menu buttons [→] or [←].
If you select 'OFF' the function will be switched off.

5 Confirm with the [OK] button.

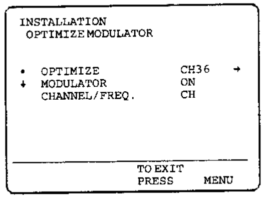
6 To end, press the [MENU] button.

▷ The 'DEMO' function is not possible during a 'TIMER recording' and during an 'Automatic recording from a satellite receiver'.

## Eliminating Picture Disturbance - Optimize the modulator

With 'Connecting without scart cable', UHF-channel CH36or 591MHz might already be being used by another TV station in your reception area. In this case the picture quality on your TV set will be adversely affected when receiving one or more TV channels.

1 Ensure that **no** cassette has been loaded. On the video recorder, **simultaneously** hold the [STOP/EJECT■/▲] and the [PLAY►] button for a few seconds until e.g.: UHF-channel 'CH36' or 'M591' appears in the display. The video recorder transmits a test picture on this UHF-channel (or this frequency).



```
INSTALLATION
 OPTIMIZE MODULATOR

•   OPTIMIZE               CH36   →
↓   MODULATOR              ON
    CHANNEL/FREQ.          CH

                   TO EXIT
                   PRESS     MENU
```

2 In line 'CHANNEL/FREQ.' select the indication for channel 'CH' or frequency 'FREQ.', using the menu buttons [→] or [←].

3 Select the line 'OPTIMIZE' with the menu buttons [P↑] or [P↓]. Press the menu button [→].

4 When the video recorder finds a 'free' TV channel, the channel or frequency will be indicated.

▷ You can also enter the channel or frequency directly with the digit buttons [0-9].

5 Tune in the TV set in this channel or frequency.

6 Confirm the channel or frequency indicated with the [OK] button.

7 To end, press the [MENU] button.

## Switching off the modulator

If you cannot eliminate picture or sound interference, you can switch off the built-in modulator. You should only do this if you have connected the video recorder to the TV set with a scart cable. 'Connecting VCR without scart cable' is not possible when the modulator is switched off.

▷ With the function 'Easy Link/NexTView' the modulator will be switched off automatically.

1 Switch on the TV set. If required, select the programme number for the video recorder.

2 Please note that **no** cassette has been inserted. Press the [STOP/EJECT■/▲] and the [PLAY►] button **simultaneously** for several seconds until e.g.: 'CH36' appears in the display.

3 Select the line 'MODULATOR' on the TV screen or 'M ON' in the display with the menu buttons [P↑] or [P↓].

4 With the menu buttons [←] or [→], select the function 'OFF' on the TV screen or 'MOFF' (modulator off) in the display. Select 'ON' on the TV screen or 'M ON' (modulator on) in the display to switch the modulator back on.

5 Confirm with the [OK] button.

6 To end, press the [MENU] button.

## Remote control of TV sets

This remote control can operate with a number of remote control commands for TV sets of different makes.
Using the **TV** button set, you can activate the following functions:

| | |
|---|---|
| [◿+/−] | TV volume plus, minus |
| [TV🔇] | Switch off sound |
| [TV⏻] | Switch off TV set |
| [P+/−] | TV programme number plus, minus |

1 Direct the remote control at the TV set.

2 Press the [TV⏻] and the digit button **at the same time**.

| Digit button | TV make |
|---|---|
| 0 | Philips, Radiola (F), Schneider (F) |
| 1 | Grundig |
| 2 | Panasonic |
| 3 | Panasonic |
| 4 | Sony |

▷ If the selected code does not operate with your TV set, or if the TV make is not contained in the list, you can try out the codes one after the other.

## Audio only record

You can use your video recorder as a HiFi tape recorder. You can record the sound from e.g. a HiFi unit or a second video recorder.

1 Use an audio cable to connect your HiFi (stereo) unit to the [AUX IN L R] socket at the back of the video recorder.

2 Select the programme number from which the 'only audio' recording should be made, using the [P↑] or [P↓] button (e.g.: 'AUX' for the [AUX IN L R] socket.

3 Press the [MENU] button. The main menu appears.

4 Select the line 'RECORD FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

5 Select the line 'AUDIO ONLY' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

6 To start sound recording, press the [●RECORD/OTR] button.

7 To stop recording, press the [STOP■] button.

8 To end, press the [MENU] button.

## Manual audio control

With the [MANUAL] button you can switch to manual audio control.

[1] Press the [MANUAL] button on the video recorder. The current selection appears in the display.

[2] Keep pressing the [MANUAL] button until 'MAN' (manual audio control) appears in the display.

[3] With the [P↑] and [P↓] buttons, adjust the recording level so that the '0dB' mark lights up during the loudest parts of the recording.

▷ With TIMER recordings and 'automatic recording from a satellite receiver' the sound is always controlled **automatically**.

▷ At step [2] you can switch back to 'AUTO.' (automatic audio control) with the menu button [→].

## Audio dubbing

This function enables you to replace (dub) the sound track of an existing recording with another sound track. To do this, connect an audio source (e.g.: a CD-player) to the [L-AUDIO-R] (programme number 'E3') socket. You can also connect a microphone to the socket [MIC.] (programme number 'MIC').

[1] Switch on the TV set. If required, select the programme number for the video recorder.

[2] Press the [MENU] button. The main menu appears.

[3] Select the line 'RECORD FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

[4] Select the line 'AUDIO DUBBING' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

[5] Select the programme number for the audio source (e.g.: 'E3'). Switch on the external audio source.

[6] During playback, locate the position on the tape at which the audio dubbing is to end.

[7] Press the [STILL/JOG ON ▶◀] button. 'STILL' appears on the TV screen.

[8] Press the [CLEAR (CL)] button. '0:00:00' appears on the TV screen.

[9] Locate the position at which the audio dubbing is to start.

[10] Press the [STILL/JOG ON ▶◀] button. 'STILL' appears on the TV screen.

[11] Press the [STOP ■] button.

[12] Press the [●RECORD/OTR] button. The video recorder will start to record the sound transmitted from the audio source. The normal (linear) sound track is re-recorded, the stereo sound will remain.
The audio recording stops **automatically** when the counter reaches '0:00:00'.

[13] To end audio dubbing,press the [MENU] button.

▷ To play back the audio dubbing, read the section 'Sound track selection' in chapter 5, 'ADDITIONAL FUNCTIONS'.

## Headphones volume

[1] During playback, press the [MENU] button. The main menu appears.

[2] Select the line 'PLAY FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].

[3] Select the line 'HEADPHONE VOLUME' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].

[4] Adjust the volume with the menu buttons [←] or [→].

[5] Confirm with the [OK] buton.

[6] To end, press the [MENU] button.

## Selecting the sound track

You can select the required sound track. This is of particular interest when the audio transmissions are multilingual.

[1] Press the [SELECT] button. The current setting will appear on the TV screen.

[2] By pressing the [SELECT] button several times you can select from the four possibilities displayed ('STEREO', 'RIGHT', 'LEFT', 'MONO').

▷ During playback you can select a fifth possibility: the 'MIXED' mode. In this mode you can playback the mono sound of the normal (linear) audio track together with the sound of the stereo audio track.

▷ If there is no stereo sound recorded on the cassette, the video recorder automatically switches to mono sound.

## Synchronous editing (synchro-edit)

You can synchronously copy between this video recorder and an appropriately equiped camera recorder. Both units are started at the same time with the help of a synchronous impulse and an adjustable start delay (=preroll time).

### Adjusting the video recorder to the camera recorder.

[1] Connect the two units with a synchro-edit cable (socket [SYNCHRO EDIT] on the left front of the video recorder).
Connect the video/audio source to the input sockets [L-AUDIO-R] and [VIDEO] (programme number 'E3') of the video recorder.
Please also observe the instruction manual of the camera recorder.

[2] Switch on the TV set. If required, select the programme number for the video recorder.

[3] Press the [MENU] button. The main menu appears.

[4] Select the line 'RECORD FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the menu button [→].

[5] Select the line 'CAMERA LINK' with the menu buttons [P↓] or [P↑].

[6] Switch the **camera recorder** to **'still picture'** (playback-pause).

[7] Confirm with the menu button [→]. The video recorder now controls the connected camera recorder type.

[8] The following message appears on the TV screen: 'VCR CONTROL DETECTED' when the video recorder controls the camera recorder or 'CAMERA CONTROL DETECTED' when the camera recorder controls the video recorder.

### Starting synchro-edit

[1] Switch on the TV set. If required, select the programme number for the video recorder.

[2] Press the [MENU] button. The main menu appears.

[3] Select the line 'RECORD FUNCTIONS' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

[4] Select the line 'SYNCHRO EDIT' with the menu buttons [P↓] or [P↑] and confirm with the [→] button.

[5] The OSD corresponding to the connected camera recorder type appears on the TV screen.

[6] Search the beginning of the recording on the video recorder.

[7] Press the [STILL/JOG ON ▶◀] button. 'STILL' appears on the TV screen.

[8] Use the [SELECT] button to select the OSD for the camera recorder.

[9] Search the beginning of the recording on the camera recorder.
Switch the camera recorder to 'still picture' (playback-Pause).

The way copying is started depends on the camera recorder type used:
**Variant 1** when the video recorder controls the camera recorder, or
**Variant 2** when the camera recorder controls the video recorder.

## Variant 1, the video recorder is to control the camera recorder

1. Start copying with the ●RECORD/OTR button on the video recorder.
   The camera recorder starts 'PLAYBACK' and at the same time the video recorder starts 'RECORDING'.

2. Stop copying with the STOP■ button on the video recorder.

3. End copying with the MENU button.

## Variant 2, the camera recorder is to control the video recorder

1. Start copying with the corresponding button on the camera recorder.
   The camera recorder starts 'PLAYBACK' and at the same time the video recorder starts 'RECORDING'.

2. Stop copying with the PAUSE or STILL button on the camera recorder.

3. End copying with the MENU button.

## Setting the 'preroll time'

When the beginning of the recording is missing, the 'preroll time' was too long. Select a shorter 'preroll time'.
If recording started too early, the 'preroll time' was too short. Select a longer 'preroll time'. You can select a 'preroll time' between 1:00 and 5:00 seconds.

1. Press the MENU button.

2. Select the line 'RECORD FUNCTIONS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

3. Select the line 'RECORD SETTINGS' with the menu buttons P↓ or P↑ and confirm with the menu button →.

4. In line 'PREROLL TIME', adjust the 'preroll time' with the menu buttons → or ←.

▷ You can also directly enter the 'preroll time' with the digit buttons 0-9.

▷ With the CLEAR (CL) button you can reset the 'preroll time' to that of the identified camera recorder type.

5. Confirm with the OK buton.

6. To end, press the MENU button.

## Before you call an engineer

If, contrary to expectation, you experience any difficulty in operating this video recorder, it may be caused by one of the reasons mentioned below. You can also call the **customer service** in your country.
You will find the telephone numbers in the enclosed guarantee leaflet.

**The set does not respond to any button being pressed:**
No power supply.
A programmed recording is currently being made.
Child lock is active.
Technical disturbance: disconnect from the mains for 30 seconds, then re-connect. If this does not have any effect, you can:
1. Disconnect from mains.
2. Re-connect to mains **whilst holding down** the STANDBY⏻ button on the video recorder until the message disappears from the display. All stored data will be reset (cleared).

**Cassette jammed:**
Don't use force. Pull out the mains plug for a moment.

**Remote control does not operate:**
Remote control not pointed toward the video recorder.
Batteries are exhausted. Change batteries.
Remote control command wrong. Read the paragraph 'Switching remote control command' in chapter 'ADDITIONAL FUNCTIONS'.

**No playback from video recorder:**
No recording on the cassette: Change cassette.
The VCR programme number on the TV set was incorrectly selected or incorrectly set: On the TV set, select the correct programme number.
The connecting cable between the TV set and the video recorder has come loose: Check cable.

**Poor playback from video recorder:**
TV set not properly adjusted.
Cassette badly worn or of poor quality: Use new cassette.
Tracking not properly adjusted, video heads dirty: Read the section about 'Selecting the picture setting (SMART PICTURE), as well as 'Eliminating picture disturbance' in chapter 'PLAYBACK'.

**No recording possible:**
TV channel not stored or wrongly selected: Check TV programmes stored.
Cassette with erase protection has been loaded: Undo erase protection.

**Programmed recording does not function:**
TIMER not set properly: Check TIMER blocks.
Time/date wrongly programmed: Check time/date.
A cassette with erase protection has been loaded: Undo erase protection.
'PDC' or 'VPS' switched on but 'PDC/VPS time' wrong: Enter PDC/VPS time exactly to the minute. Check aerial.

**Picture or sound interference on TV reception :**
Turn to Chapter 5 'EXTRA FUNCTIONS' and read in the section 'Eliminating picture interference - Optimize the modulator' and 'Switch off the modulator'.
Have your aerial checked.

**Enter the serial number of your appliance here:**

**MODEL NO./TYPE** **VR850/02**

**PROD.NO.:/SER.NR.** ......

This product complies with the requirements of the Directive 73/23/EEC + 89/336/EEC + 93/68/EEC.

# Instructions for removal

**General guidelines for removing parts of the housing, the electronics and the drive**

**When dismantling or assembling equipment, always ensure that the mains plug has been removed.**

**Due to the main voltages (hot circuit) on the primary side of the switched-mode power supply, an isolating transformer is absolutely essential for operating the device.**

**The drive or the combination drive –**
**The motherboard must not be lifted out using the transverse struts on the lift!**
**Components underneath the drive must be installed straight!**

Troubleshooting for the power supply unit may only be carried out using a variable isolating transformer.

All screws in the video recorder can be unfastened or tightened using a 10 *) Torx screwdriver.

## 1. Housing cover (Fig. 1)

- Unscrew and remove the five screws (S1).
- Lift the housing cover out of the groove and slide backwards by about 4 cm.
- Push outwards the underside of the side walls in the middle by approx. 1 cm, and lift the cover upwards.

**Assembly:**
Installation is carried out in the reverse order.

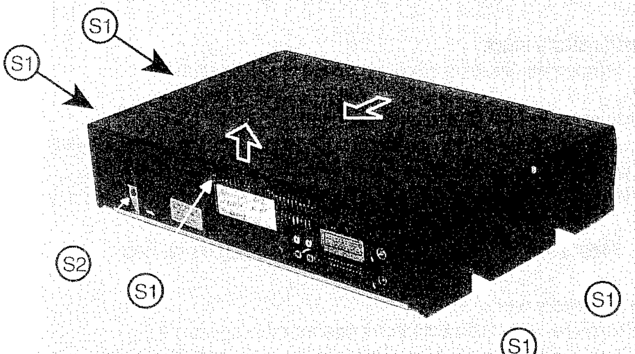


Fig. 1

## 2. Floor plate (Fig. 2)

**Preparatory work:**
Remove the housing cover as described in section 1.

- Remove the S2 screws (Fig.1).
- Turn the unit over (bottom facing upwards).
- After unlocking the three H1 snap-on hooks from left to right, the floor plate can be pushed backwards by approx.1cm and lifted off.

This means that the most important ICs and the µP on the underside of the motherboard (MOBO) are accessible.

**Installation:**
Installation is carried out in the reverse sequence.

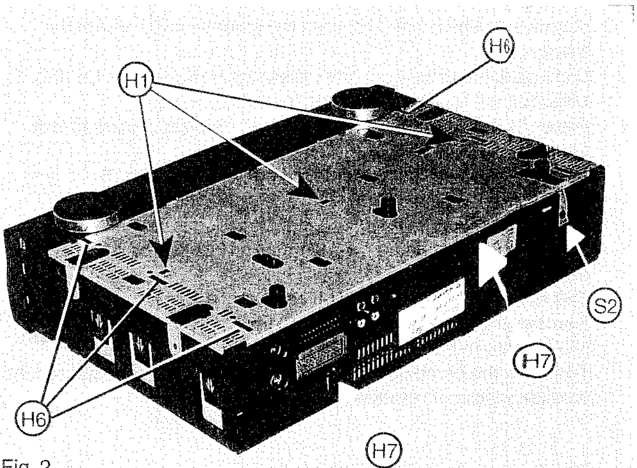


Fig. 2

## 3. Front panel (Fig. 3)

**Preparatory work**
Remove the housing cover as described in section 1.

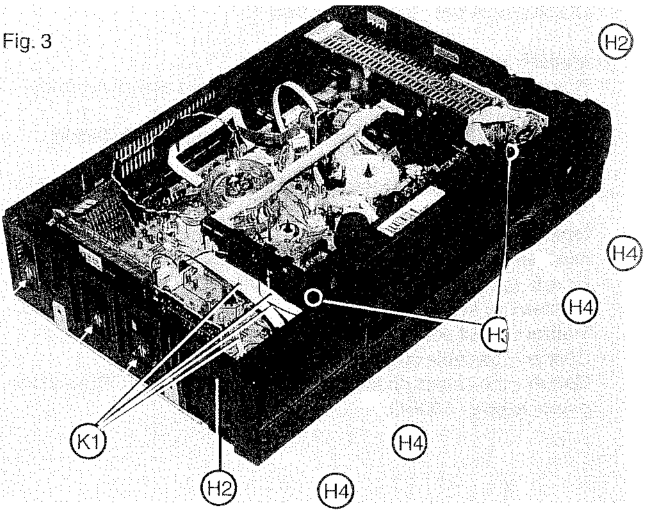
- Remove the four K1 cables from the MOBO.
- Push the two H2 snap-on hooks outwards and then push the top panel side forwards by about 2mm.
- Then unfasten the two H3 snap-on hooks on the top side.
- Finally, unfasten the four H4 snap-on hooks and pull off the front panel towards the front.

The set remains fully operable throughout this procedure.

**Installation:**
- Attach the front panel until the snap-on hooks engage.
- When doing this, make sure that the lift flap lever slides into the guide for the lift flap.
- Re-attach the four K1 cables on the MOBO.

**Important!**
- Check that all the snap-on hooks are fully engaged and that all the cables have been inserted!

Fig. 3



---

*) ... available from specialist outlets

## 4. Control printed board - ADCP / ACP

**Preparatory work**

Remove the housing cover as described in section 1.
Remove the front panel as described in section 3.

- Unfasten the eight S3 screws and lift off both boards.
- The shuttle knob can simply be taken off.

## 5. Power supply unit (Fig.1; Fig. 4)

**Preparatory work**

Remove the housing cover as described in section 1.

- Remove the S2 screws on the power supply unit (Fig.1).
- Unfasten the H5 snap-on hooks (Fig. 4) and lift the power supply unit out of the groove.

Installation is carried out in the reverse sequence.

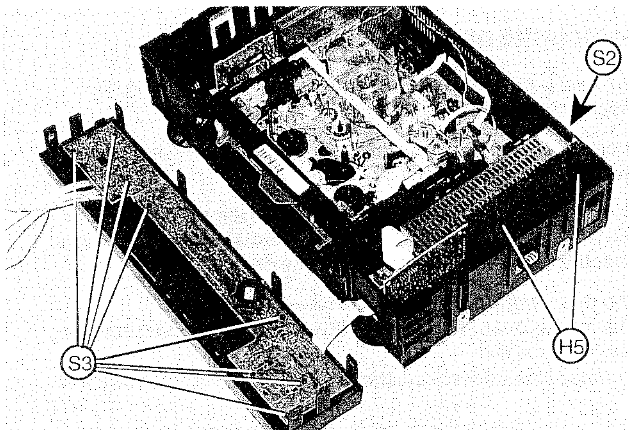
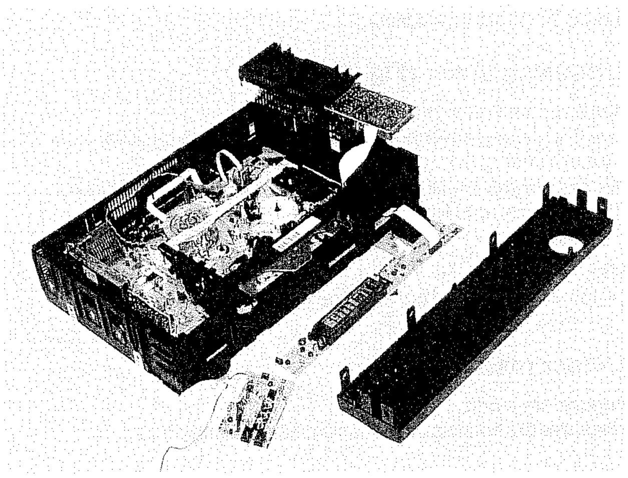


Fig. 4



## 6. Removing the MOBO combination drive

**Preparatory work**

Remove the housing cover as described in section 1.
Remove the front panel as described in section 3 and pull out the cable from the MOBO.
Remove the power supply unit as described in section 5 and pull out the cable from the MOBO.

- Remove the three fixing screws (F) in the MOBO (Fig. 5), although these screws are not absolutely necessary thanks to the design.
- Remove cables K2 and K3 from the guides on the rear of the frame.
- Slide back the lift by 5cm after releasing both lift locks LS (Fig. 5).
- Unfasten the four screws S4 on the driver (Fig. 5)
- Break off the four plastic parts sprayed onto the groove to lock the snap-on hook (Fig.3).
- Turn the unit over (bottom side facing upwards) (Fig.2).
- Fix the four H6 snap-on hooks in the open position using the plastic parts (Fig. 2).
- Unfasten the remaining two H7 snap-on hooks and lift up the frame (Fig. 2).
- The frame can now be lifted off carefully.
- Remove the four plastic parts from the groove again and DO NOT put them back into the unit.
- Turn over the combination MOBO drive carefully, and place in the service position if necessary (Fig. 6).

The device is operable in this position.
**DO NOT use the „Eject“ function !!!**

**Caution:**

No playback adjustments may be made in the service position.
**DO NOT use the „Eject“ function !!!**

**Installation:**

- Remove the cable to the control printed board and power supply unit from the MOBO.
- Place the frame on a level surface with the open side facing upwards.
- Grip the drive **at the sides** by the lift and place the MOBO drive unit into the frame.
- Make sure that the cinch socket and the scart socket are inserted into the guides.
- Check that all the snap-on hooks on the MOBO are engaged!
- Tighten any screws (F) (Fig. 5).
- Tighten the S4 screws on the drive again (Fig. 5).
- Connect the cable once more.
- Connect the cables on the control printed board - MOBO and the power supply - MOBO.

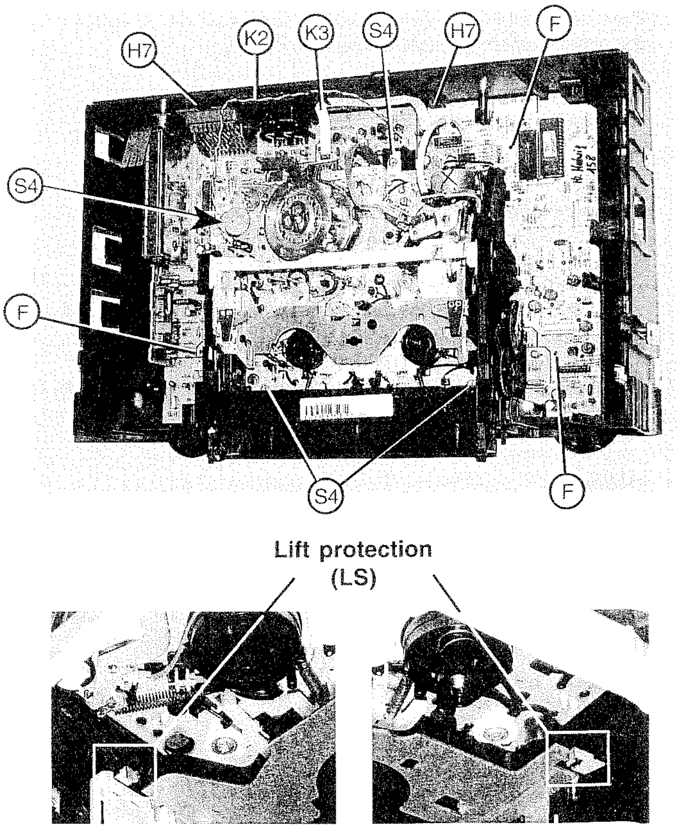


Fig. 5

## 7. Removing the drive (Fig. 5)(Fig. 6)(Fig. 8)

**Preparatory work**

Remove the housing cover as described in section 1.
Remove the front panel as described in section 3.

- After releasing both lift locks, slide back the lift by 5 cm.
- Undo and remove the four fixing screws (S4) on the drive.
- Undo and remove the earthing screw (M) on the underside. (To do this, insert the screwdriver through the hole in the rear panel.) (Fig. 8)
- Remove all cables from the drive.
- Bend the screening panel on the scanner cable backwards.
- Remove the scanner cable from the plug.
- Move the lift back to the „Eject“ position.
- Lift the drive backwards slightly to unfasten the plug connection to the capstan motor.
- Press together the two snap-on hooks (S) using pointed pliers and lift up the drive near the snap-on hooks (Fig. 7).
- The drive can now be separated from the MOBO.

**Installation:**
Installation is carried out in the reverse order.

**Important**
Make sure that the cables (K1; K2;) are positioned in the mounts on the rear of the frame, and that the earthing screw (M) is screwed on!

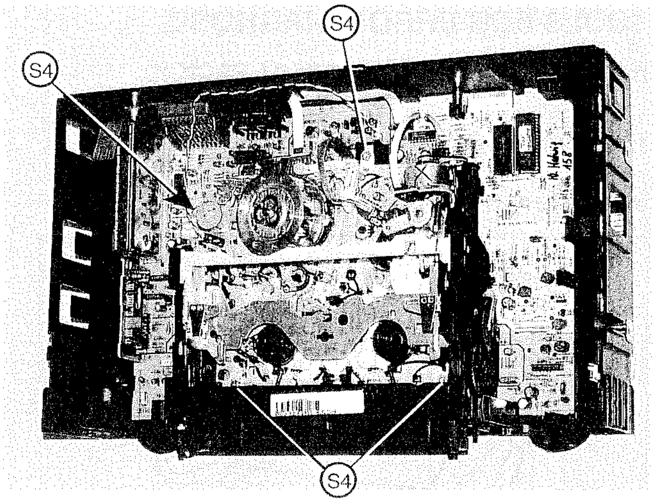
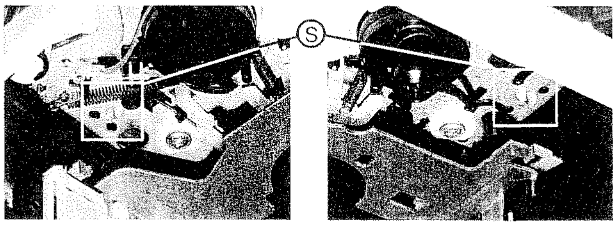


Fig. 7



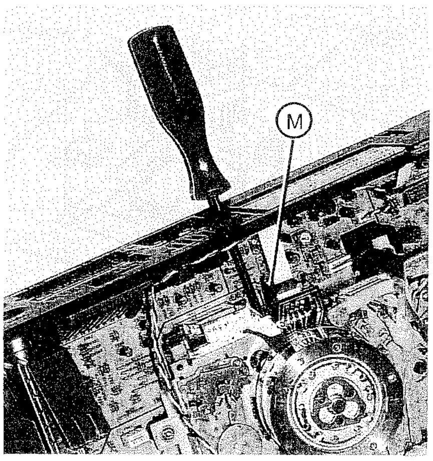


Fig. 8

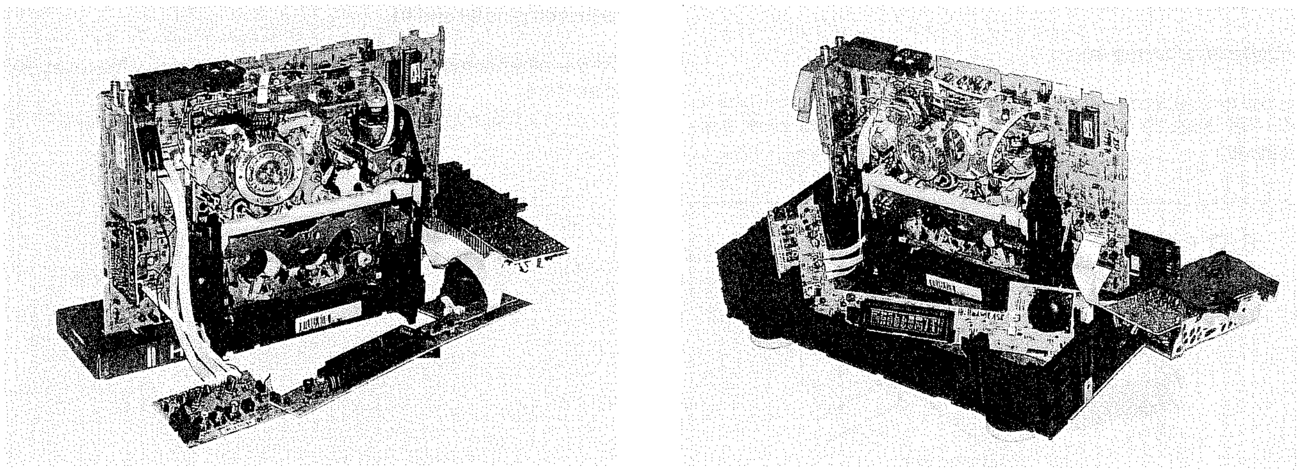


Fig. 6

# TOOLS FOR ERROR DIAGNOSIS

## How to remove/install the FLAT PACK IC

### 1. How to remove a Flat Pack IC

Using hot air Flat Pack IC unsoldering equipment

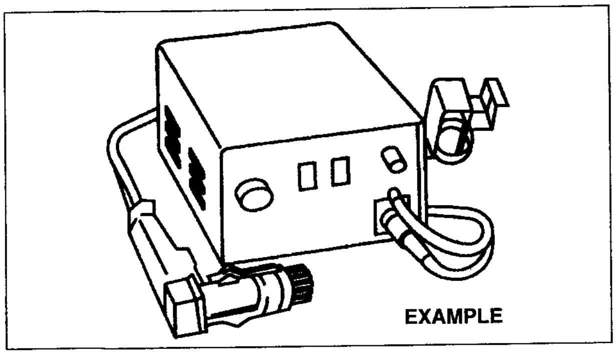


Fig. 2-1

**a.** Prepare the hot air Flat Pack IC unsoldering equipment. Then apply hot air to Flat Pack IC for 5 - 8 seconds.

**b.** Remove the Flat Pack IC with tweezers after applying the hot air.

**CAUTION:** To avoid damage, do not apply the hot air to the chip parts around the Flat Pack IC for long periods.

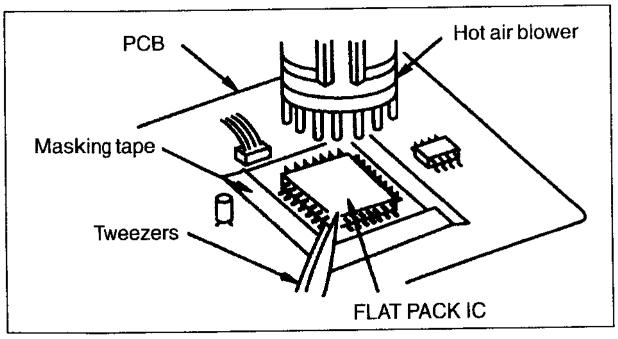

PCB
Hot air blower
Masking tape
Tweezers
FLAT PACK IC

Fig. 2-2

Protect adjacent parts with masking tape.

Flat pack ICs are fixed to the PCB with glue. When removing it, take care not to break or damage any foil under the IC or near the soldering eyelets.

**If a knife, thin screwdriver, etc. is required to remove the control/deck µP pos. 7406, it should only be used on the corner between pins 90 and 91.**

*• Using a soldering iron*

**a.** Use an unsoldering braid to remove the solder from all the pins on the Flat Pack IC. Apply solder flux to all the pins to allow easy removal.

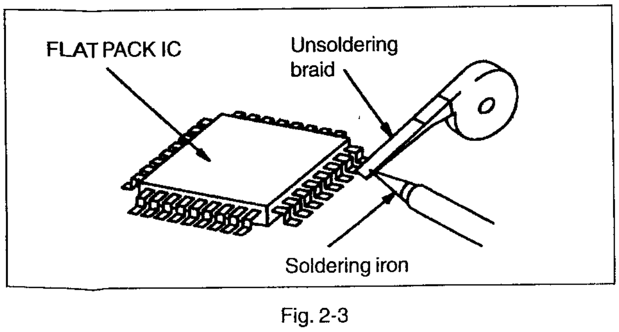

FLAT PACK IC
Unsoldering braid
Soldering iron

Fig. 2-3

**b.** Lift up each individual pin using a needle or a piece of iron wire whilst heating the pins using a fine tip soldering iron or a hot air blower.

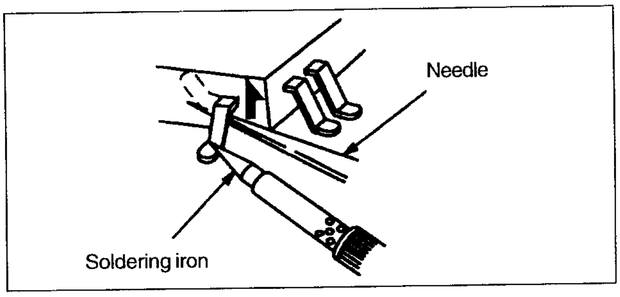

Needle
Soldering iron

Fig. 2-4

*• Using iron wire*

**a.** Use an unsoldering braid to remove the solder from all the pins on the IC. Apply solder flux to all the pins to allow easy removal.

**b.** Affix the wire to the work surface or to a fixed anchorage point (see fig. 2-5).

**c.** Pull the wire upwards as soon as the solder melts to release the pin on the IC from the PCB contact pad, whilst continuing to heat the pins using a fine tip soldering iron or hot air blower.

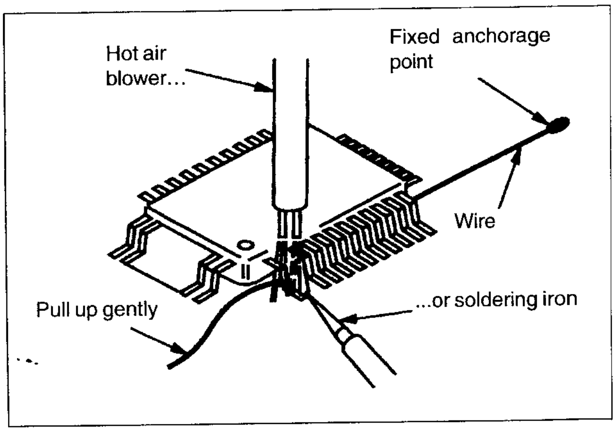

Hot air blower...
Fixed anchorage point
Wire
Pull up gently
...or soldering iron

Fig. 2-5

**Note:**
If the IC is glued, heat it first using a hot air blower to melt the glue.

**CAUTION:**
**If a knife, thin screwdriver, etc. is required to remove the control/deck µP pos. 7406, it should only be used on the corner between pins 90 and 91.**

At the other corners there are printed conductors which may be damaged!

***• Using a special solder removal device***

**a.** Apply extra tin-lead solder onto the pins

**b.** Heat the IC to melt the glue which has been used to affix it

**c.** Use a solder removing device with a special punch which matches the contours of the IC to remove the IC.

**If a knife, thin screwdriver, etc. is required to remove the control/deck µP pos. 7406, it should only be used on the corner between pins 90 and 91.**

At the other corners there are printed conductors which may be damaged!

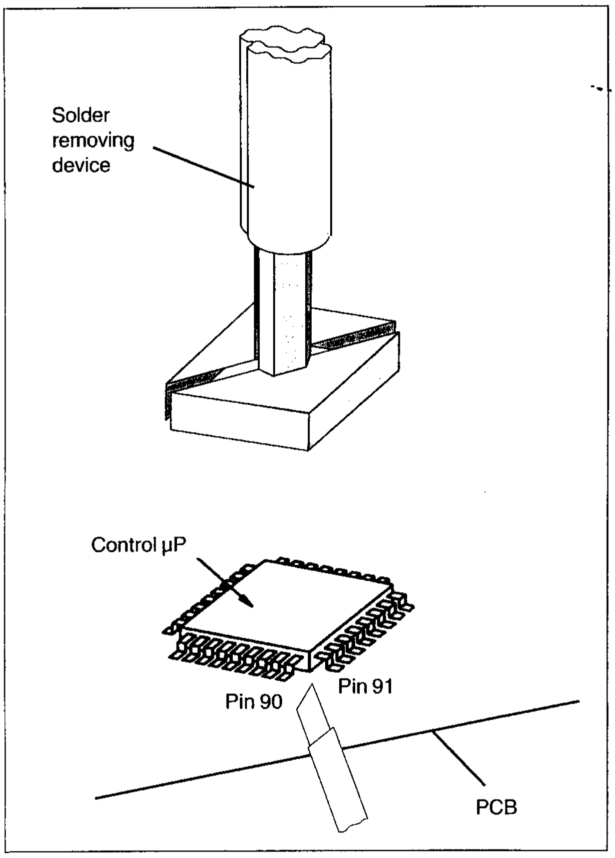

Solder removing device
Control µP
Pin 90
Pin 91
PCB

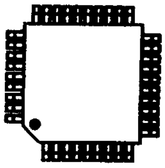
Fig. 2-6

## 2. How to install the FLAT PACK IC

**a.** Use an unsoldering braid to remove the solder on the soldering eyelets on the PCB. This makes it easier to install the new FLAT PACK IC.

**b.** The "•" mark on the IC indicates pin 1.
Make sure this mark matches contact 1 on the PCB. Solder the four corners of the IC (see fig. 2-7).

EXAMPLE



Pin 1 on the FLAT PACK IC is identified with a "•" mark.

Fig. 2-7

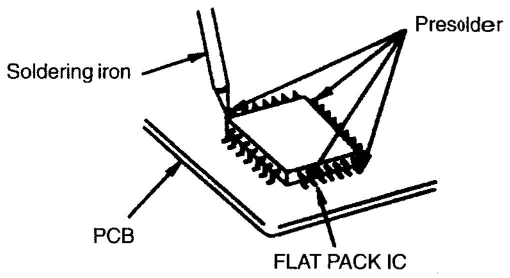

Presolder
Soldering iron
PCB
FLAT PACK IC

Fig. 2-8

**c.** Apply extra flux onto the pins

**d.** Solder all the pins on the FLAT PACK IC

**e.** Remove excess tin-lead solder using an unsoldering braid. Make sure that none of the pins have solder bridges between them.

**Note**
All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described in the "Safety instructions" section of this manual.

### Voltage measurements

Colour bar signal in RECORD and PLAY modes at normal speed.

**Note:**
The voltages for REC. and PLAY are given on the schematic diagrams in the figure below.

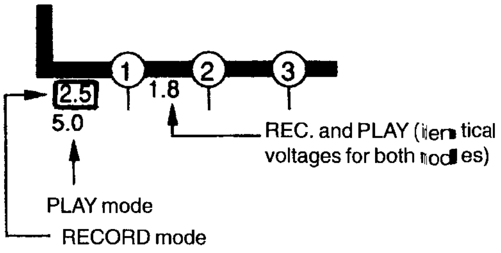

1
2
3
2.5
5.0
1.8
REC. and PLAY (identical voltages for both modes)
PLAY mode
RECORD mode

Fig. 2-10

# 2. TOOLS FOR ERROR DIAGNOSIS

## 2.1 Erasing the EEPROM

- Disconnect from the mains
- Press and hold down the Standby key, reconnect to mains and keep the Standby key depressed until the display illumination is switched off (approx. 8 sec.)

All EEPROM data will then be erased and initialised (timer and transmitter channels). The internal processor Ram is also erased, but the option codes, deck parameters, operating hours counter and adjustment values are maintained.

## 2.2 Changing the EEPROM

After changing the EEPROM the following steps must be carried out:

**Step 40:** Option code entry
**Step 51:** Setting the vertical head switching position
**Step 52:** 'Studio Picture control' adjustment
**Step 53:** Clock adjustment
**Step 60:** Level adjustment stereo decoder
**Step 61:** Channel separation stereo decoder
**Step 62:** Audio linear playback level
**Step 63:** Bargraph level

## 2.3 Service Test Program

### 2.3.1. Introduction

The software program for the microprocessors includes a service test program. It is divided into the following steps, with the following 'modes':

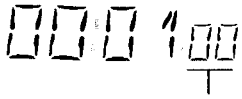
| **Step** | **Name** |
|---|---|
| 00 | Mask version |
| 01 | Deck position |
| 02 | Deck error code |
| 03 | Deck sensors and manual tracking |
| 04 | Operating hours |
| 05 | Device check |
| 10 | Operation without tape deck - dummy mode |
| 40 | Option setting |
| 51 | Vertical head switch. pos. adj. |
| 52 | SPC adjustment |
| 53 | Clock adjustment |
| 60 | Level adj. stereo decoder |
| 61 | channel separation |
| 62 | Audio linear playback level adjustment |
| 63 | Bargraph level |
| 95 | EEPROM read/write |
| 98 | Display test |
| 99 | Clock measurement |

The functionality of the set during service mode differs from the normal operation:

- All deck modes are available.
- Childlock is deactivated after calling up and exiting the service mode.
- There is no Autostandby and Autotracking. Tracking always in middle position except step 3.
- No menu and therefore no tuning.
- No preset change with UP/DOWN possible. The preset number which was set upon entering the service test program is maintained.

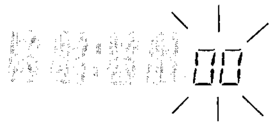
### 2.3.2. Activating and leaving the service test program

Press and hold down the 'STOP' key on the remote control. Then press the 'PLAY' key on the recorder and keep both keys depressed for at least 5 sec.
After calling up the service test programme, Step 00 is automatically displayed with the mode 'mask version number'.



Step Number

To change a step press key 'SELECT'. After this the display shows flashing the actual step number. All step modes may be selected with UP/ DOWN or digit entry. To enter and to activate the new step number press key 'SELECT'.

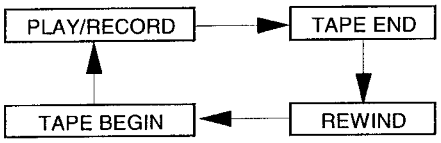


If you have entered an unknown step number the display will show flashing '--'

To leave the service program, press the STANDBY key or disconnect recorder from mains.

### 2.3.3. Continous test

In the service test program, the recorder can be put to a continous test. For this, use a cassette and activate 'PLAY' or 'REC'. The functions are then repeated continuously. In RECORD, the recorder does not go to EJECT at the tape end, but to REWIND, after which it starts RECORD again. This test serves to detect intermittent faults. The last deck-error is stored in the EEPROM. (The fault remains stored even after a power interruption.)
The continous test is ended by pressing 'STOP' or leaving the service test program.

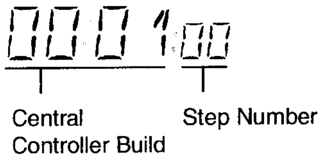

PLAY/RECORD
TAPE END
REWIND
TAPE BEGIN

### 2.3.4. Description of steps:

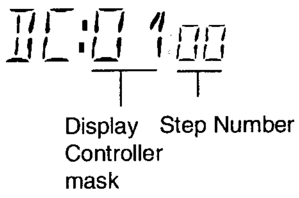
### Step 00: Display of mask version numbers

After activating the service test program, Step 00 with the mode mask version number is automatically displayed.

**a)** After calling up the service test programme, the version ('build') number of the control microprocessor is displayed,

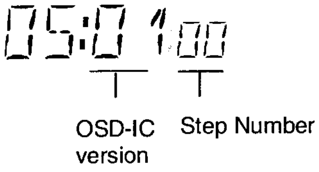

0001 00
Central Controller Build
Step Number

after pressing the 'DOWN' key,
**b)** the mask number of the Display Controller is displayed

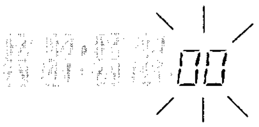

DC:01 00
Display Controller mask
Step Number

Pressing 'UP' goes back to the Central Controller mask number.

After pressing the 'Down' key again
**c)** the mask version of the On Screen Display IC is shown:


OS:01 00
OSD-IC version
Step Number

This mode can be left again by pressing the 'SELECT' key on the remote control. The currently selected step number appears and flashes on the display.

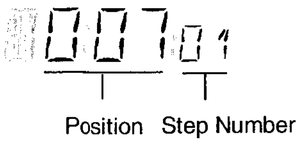


A step between 00 and 99 can now be selected.

## Step 01: Checking the drive positions

By calling up Step 01, the drive position appears on the display.
The drive position which is linked with the count of the FTA pulses of the loading tacho is shown as a 3-digit decimal number.

(e.g. 07 = Eject)



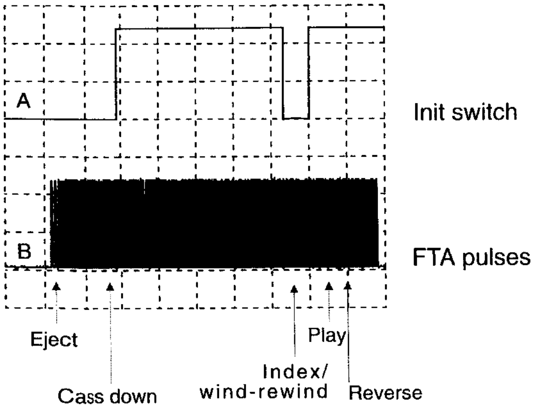
### Table of drive positions:

| Status | Position | Position |
|---|---|---|
| | no Jog/Shuttle | Jog/Shuttle |
| Eject | 7+2-2 | 7+2-2 |
| Index | 191+0-2 | 191+0-2 |
| Stop out | 200+4-4 | 200+4-4 |
| Play | 214+4-4 | 211+4-4 |
| Reverse | 237+2-0 | 237+2-0 |

### Function of the Init switch:

The diagram shows the function of the Init switch, depending on the position of the drive.

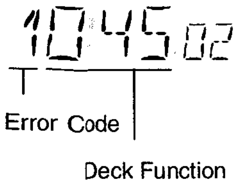
A: DC, 2 V/Div, 0.5 s/Div
B: DC, 2 V/Div, 0.5 s/Div



## Step 02: Display of the deck error code

In this step the last 3 deck error codes are displayed. On entry the display shows the last deck error code.
The deck status in which the error occured is shown with 3 digits.
The error codes remain in the EEPROM, even if the recorder is disconnected from the mains.

With the DOWN key you can select the other 2 errors; with UP you can go back to the last error again.



Remark: When a series of errors occurs, only the first error is displayed; i.e. when the deck µP detects a head motor error and wants to eject the cassette but the eject cannot be performed then the head motor error is displayed and not a threading error.

**Error table:**

| | |
|---|---|
| 0 | no error |
| 1 | threading error |
| 2 | no capstan pulses |
| 3 | tape broken |
| 4 | no pulses left reel |
| 5 | no pulses right reel |
| 6 | head motor error |

**Function table:**

| | | | | | |
|---|---|---|---|---|---|
| 12 | Standby | 115 | Viss erase | 215 | Slow motion 1/7 |
| 14 | Autotracking | 125 | Tuner - Stopout | 216 | " " 1/2 |
| 31 | Play*-3 | 126 | Auto Remain Function | 217 | " " -1/24 |
| 34 | Slow_reverse | 130 | ATTS Function | 218 | " " -1/14 |
| 41 | Still Picture | 168 | Frame+ | 219 | " " -1/7 |
| 42 | Fast | 169 | Frame- | 220 | " " -1/2 |
| 44 | Play*-9 | 170 | Play*-11 | 222 | Edit Record |
| 45 | Eject | 171 | Play*-7 | 223 | Auto align of Head sw. Pos |
| 46 | Play*9 | 172 | Play*-5 | 225 | Autotracking Abort |
| 47 | Play*-1 | 173 | Play*5 | 238 | Pause |
| 48 | Pause | 174 | Play*7 | 239 | SPC align |
| 50 | Rewind | 175 | Play*11 | 246 | Edit Pause |
| 52 | Wind | 196 | Tuner - Eject | 247 | Slow motion 1/10 |
| 53 | Play | 197 | Standby Eject | 248 | " " 1/18 |
| 54 | Stop out | 199 | Audio Dubbing | 249 | " " -1/10 |
| 55 | Record | 202 | Audio Dubbing Pause | 250 | " " -1/18 |
| 112 | Index next | 206 | Reset Tapecounter | 253 | Key Released |
| 113 | Index previous | 211 | Slowmotion 1/24 | | |
| 114 | VISS write | 212 | Slow motion 1/14 | | |

To clear all error codes press CLEAR.
After doing this the display shows:

00 12:02

## Checking the drive functions:

**Time for loading and unloading**
The signal of the photoelectric barrier which controls the revolutions of the loading motor is used as a reference for the loading and unloading time.

**Stopping of the left or right winding disk**
The tacho signals of the left (WTL) and right (WTR) winding disks are used as a control reference.

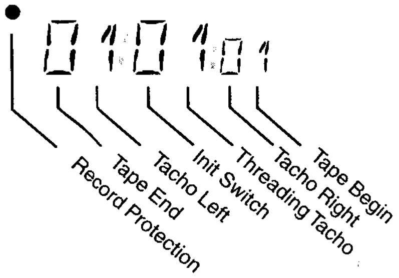
**Stopping of the head motor**
This is monitored with the PG/FG signal. The signal is derived from the e.m.f. of the non-conducting windings of the head motor, showing the speed and position of the head drum.

**Capstan motor fault**
This is monitored with the capstan tacho signal.

If one of the above sensor signals is not available, the recorder tries to put the lift to the 'EJECT' position.

## Step 03: Deck sensors and manual tracking

The display shows the deck sensors and will be updated periodically.



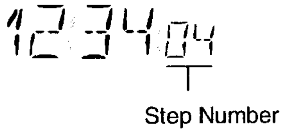
Icon '●' is used to display the status of the record protection (icon lighted means record protection active).
The actual deck status is shown as icon in dot matrix i.e. ▶ ■ ❚❚ ● ⏩ ⏪ ◀

**Tracking:**

In the service test program, the tracking is always set to the centre position. Only in this step the tracking value can be changed with the UP / DOWN keys for necessary tape adjustments (X distance).
After leaving the mode by pressing the SELECT key, the tracking value always resets itself to the centre position and cannot be changed.

## Step 04: Display of the operating hours counter:

By activating Step 04, the operating hours counter shows how many hours the head disk has turned. The hours are displayed as a 4-digit decimal number.

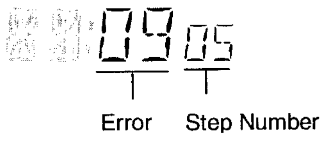


## Step 05: Bus communication error

By activating Step 05, the error code of the malfunctioning or missing IIC - component is displayed.

However, if the **EEPROM** does not acknowledge at boot time the machine does not continue to boot but displays the **error code '301-73'** in the display instead. After five seconds the machine trys to reboot. This results in an endless loop if the EEPROM is defective.

An **EEPROM Read/Write Check** is executed upon entry of service step 5.
Due to the programming time of the EEPROM the EEPROM Read/Write check may take several seconds (depending on the size of the EEPROM). If during this time the VCR is interrupted (e.g. by means of a mains reset) part of the EEPROM data may be corrupted.



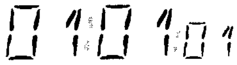
By pressing the DOWN key, all error codes can be selected in succession. If a version does not contain the IIC bus component, this is also shown as an error. (a fault of the Luminance/Chroma/Audio-processor 7005 cannot be displayed)

**Error code table:**

| Code | Description | Pos. |
|---|---|---|
| 0 | no error, all expected devices are available | |
| 1 | Tuner | 7702 |
| 2 | Modulator | 7702 |
| 5 | OSD/PDC/VPS | 7851 |
| 7 | Audio Processor: no Acknowledge | 7651 |
| 8 | Videomatrix | 7506 |
| 9 | Nicam | 1972/7700 |
| 10 | Stereo Decoder | 7771 |
| 11 | TXT data slicer (not used) | 7871 |
| 13 | EEPROM read/write error | 7401 |
| 14 | Audio Processor: no HP2 detected | 7651 |

## Step 10: Operation without drive - dummy mode

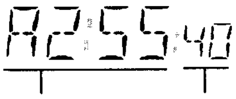
Enter the mode by pressing the SELECT key. All motors are then switched off and the sensors will be ignored by the deck microprocessor. The drive can now be dismantled from the motherboard (see dismantling instruction). **When mounting the drive ensure that the mains is disconnected!** For signal tracking, the recorder can be set to all drive conditions, i.e. signal electronics, audio and IO processing are switched to the corresponding operating mode.

- 

The step has to be left with mains interruption.

## Step 40: Option code input

If, as part of repair work, a new EEPROM is installed, it has to be initialised.
After activating Step 40, option A appears in the display.



The available options can be selected with the UP and DOWN keys.

By entering a 3-digit decimal code, the correct options (features) are set. The codes are listed on the type plate of the set.
By using the 'CLEAR' key on the remote control, incorrectly entered values can be cancelled.

After pressing the 'OK' key, the entered codes are saved and 'OK' appears on the display for approx. 5 sec.

## Step 98: Display Test

After activating Step 98, all display sections are illuminated with half the brightness.
The step has to be left with mains interruption.

# 2.4. Customer Service Mode (CSM)

## 2.4.1 General

Answering customer questions on the phone is a lot easier if the customer could be more specific about his problem. Once the Customer Information Center CIC knows the problem in the most cases the answer is easy. The Customer Service Mode helps customers to be more specific in their questions by providing them with a built in menu driven on-screen diagnostics system. It therefore helps dealers and CIC to provide fast and correct answers via phone.

The system enables:

- Easier handling of non-technical calls.
- More reliable information to the customer that a repair action is necessary.
- Identification of software versions via phone.

The Customer Service Mode is a read only, menu based information system which can be called up by the customer at home.

## 2.4.2 Calling up the Customer Service Mode

To enter the customer service mode press first STOP on the set and then MENU on the remote control and keep the keys depressed for a period of 5 seconds.
This procedure works independently of the status of Child Lock (if this feature is available) or the VCR adress.

## 2.4.3 Operation inside the CSM

All deck functions are possible. Functions which need a menu are not allowed.
By the help of the cursor up/down the customer can step through all stored programs.
Toggling between two tables is possible by pressing the MENU button on the remote control.

## 2.4.4 Deactivation

The customer can deactivate the Customer Service Mode by pressing 'STANDBY' on the VCR.

## 2.4.5 Contents of the Customer Service Mode

**Table 1**

```
CUSTOMER SERVICE MODE 1                  XX:XX

VERSION       CC  XXXX  DC  XX
DECKERR  X  X  X  ER  XX  XX  XX  XX   XX
RPROT  XXX  CHILDL  XXX   P 50     XXX
DREC   XXX  DEC  XXX      16:9     XXX
VCR X       REMOTE  X     CASS    XXXX
PROG  XX  SYSTEM  XXXXX  NAME    XXXXX
TUNE  XXXXXXXXX  MOD  XXXXXXXXXXXX

MODE  XXXXXXXXXX  XX  PREROLL  X:XX
AUDIO  XXXXXXXX       HEADPHONE   XX
VIDEO  XXXXXXXX
WARNING  XXXXXXXXXXXXXXXXXXXXXXX
```

| | |
|---|---|
| XX:XX | Actual time |
| VERSION CC | Version number of central control |
| DC | Software version of display controller |
| DECK ERR E1..3 | Deck error code; for an overview of the codes see Step 2 of Service Test Program |
| ER 0...15 | Electrical Error Code according Step 5 of Service Test Program |
| VCR = 1 / 2 | VCR adress |
| REM = 1 / 2 | Last detected remote adress |
| CASS | Cassette length |
| RPROT = ON/OFF | Record Protection |
| CHILDL = ON/OFF | Child Lock |
| P50 = -/1/2 | Easy Link not / release 1 / release 2 active |
| DREC = ON/OFF | Direct Record |
| DEC = ON/OFF | Decoder |
| 16:9 = ON/OFF | 16:9 screen aspect ratio identification |
| PROG | program number |
| SYSTEM | in REC/EE received colour system, in playback system from tape |
| TUNE | Frequency or Channel (dependent on actual selection) + optional value of fine tuning |
| NAME | Detected transmitter name |
| MOD | Modulator 'ON/OFF' or 'NO' in case of RF booster, frequency, audio mode G/K |
| MODE | Tape deck mode, Record Modes..., last 2 digits: SPEED = SP/LP |
| PREROLL | actual detected preroll value (default value in case no camera connected) |
| AUDIO | in Playback: MONO - L - R - ST - MIX; in Record or EE: AUTO/MAN and level value |
| HEADPHONE | Actual volume value |
| VIDEO | Smart picture info |
| WARNING | Last warning info |

## Table of electrical Error-Codes:

| Code | Description | Pos. |
|---|---|---|
| 0 | no error, all expected devices are available | |
| 1 | Tuner | 7702 |
| 2 | Modulator | 7702 |
| 5 | OSD/PDC/VPS | 7851 |
| 7 | Audio Processor: no Acknowledge | 7651 |
| 8 | Videomatrix | 7506 |
| 9 | Nicam | 1972/7700 |
| 10 | Stereo Decoder | 7771 |
| 11 | TXT data slicer (not used) | 7871 |
| 13 | EEPROM read/write error | 7401 |
| 14 | Audio Processor: no HP2 detected | 7651 |

## Table of Deck Error-Codes:

| | |
|---|---|
| 0 | no error |
| 1 | threading error |
| 2 | no capstan pulses |
| 3 | tape broken |
| 4 | no pulses left reel |
| 5 | no pulses right reel |
| 6 | head motor error |

**Table 2**

```
CUSTOMER SERVICE MODE 2            XX:XX

YEAR XXXX      MONTH XX      DATE XX
 DATE    PROG    START  V/P  END     LP
1XXXXXX  XXXXX   XX:XX   X   XX:XX    X
2XXXXXX  XXXXX   XX:XX   X   XX:XX    X
3XXXXXX  XXXXX   XX:XX   X   XX:XX    X
4XXXXXX  XXXXX   XX:XX   X   XX:XX    X
5XXXXXX  XXXXX   XX:XX   X   XX:XX    X
6XXXXXX  XXXXX   XX:XX   X   XX:XX    X


V/P DET XXXXX
```

Actual time, year, month, date

– Actual timer settings

– V/P: VPS/PDC detection of actual received transmitter 'ERROR/ VALID'

# Circuit descriptions

## 1. Switched-mode power supply PS

### 1.1 Technical data

| | |
|---|---|
| Mains voltage: | 220-240 V ac ±10 % |
| Maximum output: | 40W |
| Operating frequency: | 55 kHz |
| Efficiency: | approx. 80 % at max. output |

### 1.2 Functional principle (blocking oscillator)

During the conductive phase of the switching transistor, supply energy is transferred into the transformer. This energy is passed to the secondary part in the blocking phase. Using the switch-on time, the energy transferred in every cycle is regulated in such a way that the output voltages are unaffected by changes in the load or input voltages. The Mosfet [7150] is controlled by the IC [7151].

### 1.3 Low power stand-by mode

In 'low power standby mode', a large percentage of the 5V load, the 12V supply and the 33V supply on the motherboard is switched off. The power supply then operates with reduced operating frequency (approx. 35 kHz) to reduce the switching power losses in the Mosfet [7150].

The power input is less than 4 Watts in this condition.

### 1.4 Point of reversal

Maximum output is transferred at this point of the output characteristic.

### 1.5 Overload:

The power supply operates in Burst Mode. The energy is limited in every cycle, so that the
output power is low **(Fig.1)**.

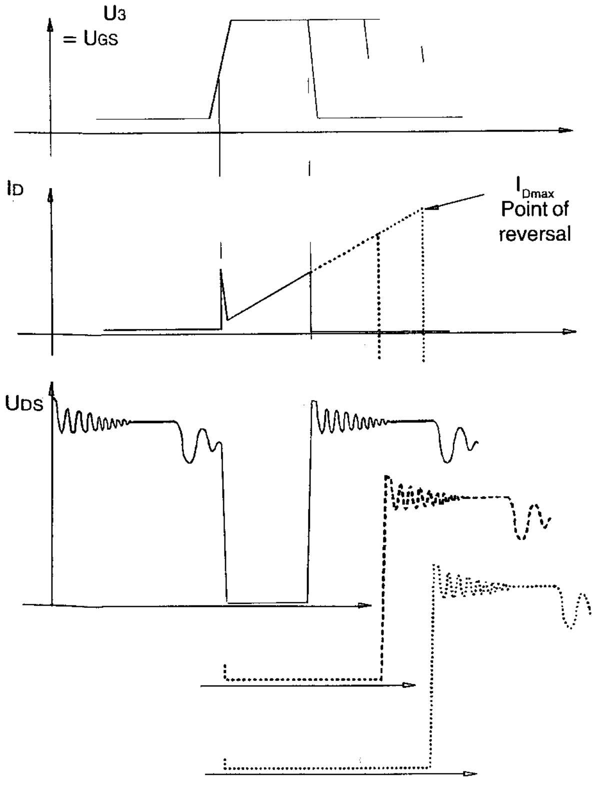


Fig.1

### 1.6 Circuit description:

There is a filter [5150, 2150] in the supply voltage part, which protects the power supply against any interference from the mains. The mains voltage is rectified by the bridge rectifier [6151, 6152, 6153, 6154] and buffered by electrolytic capacitor [2152]. Electrolytic capacitor [2154] is loaded using charge pumps [2151, 6155, 6156] and [3155] and is used to supply the IC [7151] during the start-up phase. After this, the IC is supplied by transformer coil 1-7 with diode [6157]. During the switch-on time of the switching transistor, a current flows from the rectified supply voltage through the primary coil of the transformer, the transistor and the shunts 7150, 3113 to earth. As the positive voltage at pin 3 of the transformer is constant (for this exercise), the current increases linearly and forms a ramp, depending on the mains voltage and the inductivity of the primary coil (U=L*di/dt). A magnetic field representing a certain volume of the primary current is formed inside the transformer. The secondary voltages are polarised in such a way that the diodes block during this phase. A voltage image of the primary current is passed to pin 7 of the IC [7151] via resistors [3160,3161]. This is checked and, as soon as it reaches a certain value, depending on the control voltage at pin 14 on the IC, the transistor [7150] is switched off.

Once the switching transistor [7150] blocks, no more energy is transferred into the transformer. The inductivity of the transformer now attempts to maintain the current which flowed through it at a constant level. The current, however, decreases (di/dt < 0) and the polarities of the voltages at the transformer reverse, causing a current to flow through the secondary coils of the transformer, the secondary diodes [6164, 6165, 6166, 6169 6170/6171] which are now conductive, and the load. This current is also ramp-shaped but decreasing.

The output voltages in the switched-mode power supply are controlled by changing the length of the conductive phase of the switching transistor [7150] so that either more or less energy is transferred from the supply to the transformer. The control information is provided by the control element [7153]. This element compares the 5V output with an internal 2.5V reference voltage using a voltage divider. The output voltage of [7153] is passed to pin 14 on the IC [7151] via an optocoupler (for galvanic isolation). It compares this voltages with an internal reference. The resulting value is compared with the voltage on pin 7 (equivalent to the primary current). The voltage on pin 5 of the IC [7151] is required for FOLD BACK in case of overloading. The maximum available secondary power is determined by resistors [3113, 3160, 3161]. If the voltage on pin 7 of the IC rises to a certain value (typ. 1V), the power supply enters the reversal point, and power limiting is activated.

Six voltages are made available on the secondary side, which are rectified by [6170/6171, 6169, 6167, 6166, 6165, 6164]. The motor voltage 8-17M2 is switched over with the control line CSW and transistors [7158, 7159].

### 1.7 Description of the start-up phase

After connection to the mains, the following voltages at the connections on the IC [71511 (Fig.2) rise at time to Vcc (pin1) corresponding to the half-wave loading via charge pumps [2151, 6155, 6156] to Vccstart. In this case, the current input is typically 0.3 mA. The IC starts to function when Vccstart is reached (approx. 1 4V), the power intake of the IC then rises to approx. 17 mA. The operating frequency is determined by the capacitor on pin 10 (approx. 55 kHz).

If Vcc drops below the limit value Vdis2 (typ. 9V) before the reversal point has been reached (e.g. with various short-circuits), or if Vcc rises to Vccprot (typ. 16V, e.g. if the control loop is interrupted), the output on the IC (pin 3) is blocked. The IC then attempts to re-start **(Fig. 2)**.

**Attention:** The power supply needs a minimum load of 200mA on the 5V output to start up.
Is the load less than the 200 mA (e.g. defective 5V fuse on the motherboard or the cable from the power supply is not connected) the power supply switches to the 'Bust' or 'Hick up' mode.

**Start Up and Overvoltage protection:**

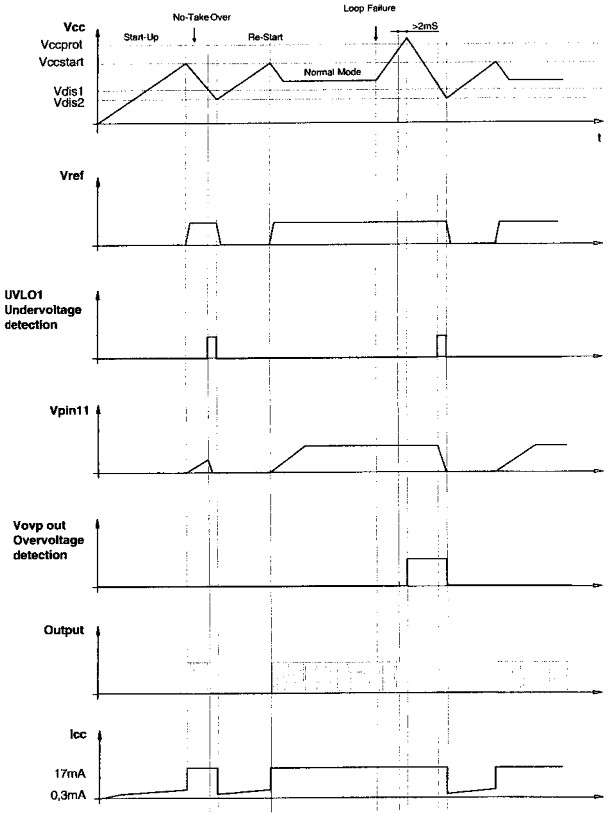


Fig.2

## 1.8 Normal operation, overload, standby

After start-up, the IC [7151 ] is in normal mode. The voltage at pin 14 is typically 2.5V. If the load increases on the power supply output, the IC increases the switch-on time for the Mosfet [7150]. The peak voltage value at pin 7 (equal to the primary current in the transformer) also increases. If the load continues to rise, the IC limits the switch-on time for the power transistor [7150] typically from 1 Vpeek at pin 7 on the IC (reversal point).

The IC power supply Vcc from transformer coil 1-7 acts as the secondary voltages. This means that Vcc also reduces with increasing load. When Vcc < Vdis1 (typ. 9V) the IC goes into Burst Mode. The short-circuit power is low, as the interval between the start-up attempts is great.

The switch-on time is shortened if the load is decreasing. If the load continues to decrease, the IC switches the frequency back to approx. 25 kHz (Standby Mode) from a certain voltage threshold at pin 7. This reduces the switching power losses on the transistor.

## 1.9 Overheating

The IC [7151] contains overheating protection which blocks the output stage if the chip temperature is too high (typ. 155 ºC). The attempt can be made to re-start once the temperature has been reduced.

# 2. Front end FV and stereo decoder FM_STEREO

## 2.1 Functional groups

- TUMOD = Tuner + Modulator
- IF amplifier & video demodulat with FM and AM demodulator
- FM stereo decoder TDA 9840
- NICAM decoder SAA 7283/84

## 2.2 Systems which can be received

- PAL B/G with FM stereo
- PAL 1 or PAL BG with NICAM stereo
- PAL BG with NICAM and FM stereo
- PAL BG/I SECAM L/L' with NICAM and FM stereo
- PAL BG SECAM DIK with FM stereo

All front end variations conform to the EN 55020 standard.

## 2.3 Tuner/modulator with passive loop through (TUMOD)

Tuner and Modulator are fitted into the same housing. Both the tuner and the modulator are PLL-controlled. The reception frequency or modulator frequency is set using the IIC bus.

The HF loop through to the TV unit is also ensured in LOW POWER MODE (without supply voltage) (PASSIVE LOOP THROUGH).

The amplification is determined by the AGC voltage at pin 5 [1701] (for operation, see AGC section).

## 2.4 IF selection

The intermediate frequency of the picture carrier is 38.9 MHz for all systems except SECAM L' (33.9MHz).

A quasi-split sound system (QSS) is used for all FE variants; i.e. separate surface wave filters (OFW or SAW...Surface Area Wave) are required for the picture and sound carrier [1701,1702].

The sound used OFW (K9456M and K9463M) have two different filter characteristics which can be switched.

For the PAL BG/I-SECAM L/L' variant, an additional circuit for suppressing the adjacent channel sound carrier is provided, which is set using coil [5704] to maximum suppression at 40.4MHz.

## 2.5 IF demodulator

### 2.5.1 TDA 981 3T

There are separate internal modules for processing the IF signal for picture and sound.
The output signal of the OFW is initially amplified and then synchronously demodulated. The carrier required for this purpose is regenerated from the input signal via a PLL. The integrated VCO oscillates at double the picture carrier frequency (77.8MHz) and this frequency is set internally. The loop filter for the PLL is connected on pin 5. At pin 20, an AFC voltage (Automatic Frequency Control) is available, which is evaluated for station tuning.
At pin 18, there is a demodulated video signal and the sound carrier at 5.5MHz or 6.0MHz (FM sound) or at 6.552MHz or 5.85MHz (see NICAM sound). After a sound trap, the video signal passes to an internal 6dB buffer (pin 19). A voltage divider and an emitter follower for level adaptation (1 Vpp) are arranged at the output of the buffer (pin 8).
The IC has an output for the sound carrier at 5.5MHz (6.5MHz) and 5.74MHz (6.258MHz). These are connected to the FM demodulators via filters (pins 14, 15). The audio signals are conveyed to the stereo decoder part on the stereo decoder TDA9840T (see below).
For NICAM, a second IF (SSIF) is passed to the QNIC sub-printed board.
For the BG/DK stereo variant, the second audio IF is conveyed optionally to the audio filter pair 5.5/5.74 MHz or 6.5/6.25 MHz via a switchover IC [7708].

### 2.5.2 TDA 9814T

This IC is operated only in QSS. In addition to the TDA 9813, it also contains an AM demodulator for Secam L, L'. The second audio IF is passed via a switchover IC [7708] optionally to the audio filter pair for FM stereo 5.5/5.74 MHz or a 6.0 MHz filter for PAL 1 reception.

### 2.5.3 TDA 9812T

This IC is only used for a mono version for the PAL BG/I SEC L/L' variant and is a mono version of the TDA 9814 with identical pinning.

### 2.5.4 AGC

The two-stage AGC is the same for all ICs. For small signals, the control is only carried out in the IF-IC whilst the tuner operates with maximum amplification. From a certain input level (take over point) a control signal is issued for the tuner from the IF-IC. From this input voltage onwards, the control is basically only carried out by the tuner. The take-over point is set using potentiometer AGC-Adj. [3722] to the optimal sensitivity and input interference immunity. The IF-AGC voltage is supplied to the control-µP via transistor [7707). This is used to determine the sequence of the programs to be stored in Autostore mode.

### 2.5.5 FM Stereo decoder TDA 9840T

For FM stereo, the signals L+R or 2R are transmitted by the sound carriers. To arrive at the L and R, a decoding circuit is required. This computing circuit is implemented in the TDA9840T. The input attenuators can be set with the IIC bus and are used to adjust the level and set the channel separation. The frequencies containing the stereo recognition or dual tone recognition are filtered out via an LC network. For dual audio or MONO, the aforementioned computing circuit is deactivated.
The de-emphasis is carried out internally by the capacitors [2775 and 2779].
For the variants with NICAM and FM stereo, the output signals for the NICAM part are passed to the output selection switch on the TDA9840T (pin 9,10) and the audio signal is selected in the TDA9840T (outputs pin 13,14) via the IIC bus using software.

## 3. FM Audio AF

### 3.1 General

All audio input and output selection switches, and the hi-fi FM audio signal processing, are located in the TDA9616 [7651]. This IC is controlled solely by the IIC bus. The carrier frequencies and bandpass filter for the FM audio part are adjusted by the TDA9616 independently. This adjustment is started via the IIC bus following a mains reset. The HP2 signal is used as a reference for this (pin 40).

### 3.2 Audio IO

The input and output selection switches are controlled by the IIC bus. Audio signals from the front end, both Scart sockets, the cinch sockets on the rear of the unit, the microphone amplifier and the front sockets, are passed via pins 1 to 10 or 44 to the two input selection switches which select the respective signals for the FM and the linear audio part. The output selection switches for Scart 1, connected in parallel to the cinch outputs; Scart 2 and the headphone output (pins 15, 16, 18, 19, 13, 14) independently select the respective signal sources.

The RFAGC limits the maximum amplitude of the signal to the modulator (AMCO) to prevent overmodulation.

The line TRIA _ ALM passes (controlled by the IIC) the size of the audio signals or the level of the playback envelope curve (during tracking) to the deck processor.

### 3.3 FM Audio

### 3.3.1 Recording:

The signal coming from the input selector switch (INPUT SEL) reaches, via a level actuator (VOLUME) and a deep pass filter (fg > 30 kHz), the NOISE REDUCTION block, which compresses the dynamics during recording. The compressed signal is passed to both FM modulators (1.4MHz and 1.8MHz carrier frequencies). Both carriers are added and reach the head amplifier via pin 36. beiden Träger werden addiert und gelangen über Pin 36 zum Kopfverstärker.

### 3.3.2 Playback:

The signal from the head amplifier is passed to the HF-AGC via pin 37 where the tape and scanner tolerances are compensated. Via the two band pass filter and limiters, the FM signals reach the PLL demodulators. Head change-over interference is bypassed using SAMPLE & HOLD (triggered by the HP2 signal). The demodulated signals are then expanded in the NOISE REDUCTION part. The hi-fi signals are then available at the output selection switches. If no FM playback is present, the IC automatically switches the output selection switches to linear audio.

### 3.4 Interface to the linear audio

In recording mode, the input selection switch NORMAL SEL in the TDA9604 [7850] selects the audio source for the linear audio part in the signal electronics IC (LA72525) and passes this signal to pin 17 (AMLR).

In stereo sets, the input selection switch on the signal electronics IC LA71525 [7007] is always set to IN2 (pin 73).

During playback, the AMLP signal from the linear audio part in the signal electronics IC (pin 77) is carried via pin 19 from TDA9604 [7850] to the playback level attenuator (NILevel),which can be adjusted in service mode using the IIC bus.

## 4. Audio linear (AL)

The signal input for recording to loop-through (EE) is pin 73 on LA71525 [7005]. During record and EE, the selected signal passes through the linear amplifier and then a mute stage and before leaving the IC on pin 77. This is output leading to the FM audio part. The attenuation chain on pin 77 sets the required level for the ALC (Automatic Level Control) detector, whose time constant is determined at pin 72, and the level for the recording amplifier. L5601, R3615 and C2610 form the pre-emphasis for the recording amplifier.

The output for the recording amplifier is pin 1. The recording current is then added to the bias current via resistor [3622] and flows via the head to pin 5, where the switch is closed. During playback, the switch at pin 7 is closed. The playback signal is amplified during the equalizer stage (time constant between pin 8 and pin 10. The resistor [3629] and the capacitor [2622] determine the head resonance during playback.

In longplay mode, the frequency characteristic is adjusted with RC networks [C2611, R36151 for record and with [C2612] for playback.

The erase oscillator supplies a signal with approx. 70 kHz for the audio erase head and the bias current. To avoid interference, the oscillator should be switched on and off slowly (switching stage T7604, time constant C2609, R3617, R3610).

The bias current is set using potentiometer [3626]. The maximum current for the oscillator circuit is limited to approx. 60mA using R3611 and the base current divider resistors on T7604.

# 5. Head amplifier (HA)

## 5.1 FM audio part

Head amplifier IC STV5712 [7104]

### 5.1.1 Recording

Pin10 SW REC switches to record. The inverter switch 7102 protects against deletion if the power supply is interrupted.
The recording current signal is supplied from the FM audio processor TDA9616 to input VIN pin 11.
Pin 15 IOUT acts as a current source for the recording current to the heads.

### 5.1.2 Playback

One low-noise playback amplifier for each head is switched into the signal path via the head selection switch SW_H pin 9. The FMAP output leads to the FM audio processor TDA9616.

## 5.2 Video part

Head amplifier IC STV5744 [7103] (4 heads), STV5742 [7108] (2 heads)

### 5.2.1 Recording

FMPV is the input for the switchover to REC using switch 7105. REC IN is an addition point for the recording current signals luminance, PAL chroma and SECAM chroma.
IOUT acts as a current source for the recording current to the heads.
The current through 3114 on TRIV acts as a current reference for setting the recording current. Pin 18 or 14 is also an input which is used to control the recording current.
7107 switches with 4 head devices and SP recording, a resistance parallel to 3114 and therefore allows the required increase in recording current for SP.
The Record AGC is only specified during CSYNC2 = H.

### 5.2.2 Playback

FMPV is the output for the playback signal to the video processor LA71527.
One low-noise playback amplifier for each head is switched into the signal path via the head selection switch SWIN.
The voltage at TRIV supplies a direct voltage proportional to the signal strength from FMPV, which can be evaluated for the automatic tracking.
For picture search, the SP and LP heads are changed over using the next rising edge in the CSYNC2, in other words, at the end of the line in the non-visible area.
ISWS short-circuits the unused head pair to the amplifier inputs, thereby correcting the crosstalk in the ring transformer in the scanner.
ENVC supplies the information as to whether or not the signal is greater than the SP or LP heads.

# 6. Video Signal Processing VS, SECAM L-chroma processing VS-SEC, chroma noise reduction CNR

## 6.1 Switchover functions in the signal electronics IC LA71527

The signal electronics IC LA71527 [7005] are controlled by the control-µP via the IIC bus on pins 63 and 64.

**REC/PB**
via the IIC bus
During RECORD pin 19 (REC HIGH OUT) goes to 5V

**PAL/SECAM/MESECAM/NTSC**
Via the IIC bus
During NTSC playback, pin 43 goes to 5V

**SP/LP/SLP**
Via the IIC bus

**VIDEO ENTRY**
At pin 33 (FFP), the artificial picture pulse for the playback features is entered:

| | |
|---|---|
| Loop through | < 0.8V |
| Artificial picture pulse | > 3.7V |

**COLOR VECTOR**
The color vector is adjusted using pin 67 (CSCP):

| | |
|---|---|
| Normal | < 0.8V |
| LP features color = HSC signal | |

## 6.2 Recording :

### 6.2.1 Luminance

The input signal (VBS) is available on the IC [7005] pin 35 as FBAS with 1Vss. In the IC [7005], the video signal first passes through an amplification control (time constant determined by C [2035]). Following the AGC, the signal reaches a terminal stage, is attenuated by 6 dB and goes via a 3.5 MHz deep pass filter to the chroma disconnection to the vertical emphasis (out: pin 42, in: pin 40). This emphasis comprises a 1 H-CCD delay line in the IC [7003] (in: pin 5, out: pin 7) and an emitter follower [7004]. The signal then travels via another emitter follower 7006 from pin 25 to pin 26. The filter does not function in REC mode on the basis of the emitter follower, due to the low resistance of the emitter follower. The Y signal then travels through the detail enhancer, the non-linear emphasis, the linear emphasis (time constant via pin 23,24) and the white/dark clipping stage.
The signal generated in this way then control the FM modulator directly. Before the FM signal leaves the IC [7005] at pin 18, it passes through a further low pass filter. Then it is passed to the chroma signal via an external emitter follower [7008) and RC cell as FMRV in the head amplifier addition point.

### 6.2.2 Chrominance PAL

The chroma signal is separated from the incoming video signal (pin 35) by a band pass filter (BPF1) and reaches an ACC stage. The ACC amplifier stage controls the chroma amplitude for the subsequent stages (time constant via capacitor [2057] on pin 13). The chroma signal is then conveyed to the main converter. The main converter mixes the 5.06MHz subcarrier on the auxiliary converter with the 4.43 MHz chroma signal to the 627kHz chroma FM signal.

The subcarrier is a mixture of 4.43MHz (the REC APC time constant on pin 54 compares quartz and burst frequency) and (40+ 1/8) fH = 627kHz (produced by 321fH -VCO, time constant pin 49/51 and phase rotation in accordance with the VHS standard, control pin 66). Via a band pass filter and the color killer stage, the converted chroma signal reaches pin 14 on the IC, where it is added directly to the Y FM signal via an adjustment controller [3118]. The color killer can either identify the incoming signal itself (PAL yes/no, PAL: chroma signal out, SECAM L: chroma signal killed) or can be set to PAL or SECAM L via the IIC bus. The quartz oscillation (pin 56) is used for chroma processing, in addition to the reference frequency, and also for generating the pulse frequency for the combined CCD [7003, pin 10] and for the chroma noise reduction-IC [7807, pin 10].

### 6.2.3 MESECAM

The signal path is virtually identical to the path for PAL.

**The differences are:**

- No phase rotation.
- The filter characteristic for the chroma band passes becomes wider.
- Free-running quartz frequency
- The control-µP generates the control signal for MESECAM via the IIC bus

### 6.2.4 SECAM L

The FBAS signal (VBS) from the in/out part reaches, via the emitter follower [7068] the bell filter (cloche), which returns the emitter-side HF pre-emphasis. In Secam L- IC pin 29 [7066], the signal goes through a 15dB amplifier and a frequency divider. This generates the 1.1 MHz signal required for the recording using frequency separation (1:4) on the chroma signal. This signal is then connected to pin 21, followed by a band pass filter. The band pass filter suppresses the harmonic waves which occur during the frequency separation. At the same time, the chroma signal is blanked at this point during the line synchronous pulse period. It then runs through a 10dB amplifier and is connected to pin 15 on an anti-cloche filter. This produces the FM pre-emphasis again, which is provided as standard for a Secam chroma signal. This is then added to the Y-FM signal via and adjustment controller [3076] as CSRV signal to the head amplifier addition point.

## 6.3 Playback:

### 6.3.1 Luminance

The FM playback signal goes from the head amplifier [7103/ 7108] to the signal electronics [7005], pin 15 as FMPV. In the IC [7005], the level of the envelope curve is first controlled and then filtered in FM processing. On pin 17, the signal exits the IC, runs through a phase shifter and a transistor stage to adjust the filter characteristics and re-enters the IC [7005] on pin 20. The FM signal limited using the double limiter is demodulated and filtered using a deep pass. The demodulated Y signal is also affected by the recording-side pre-emphasis. This now removes the linear de-emphasis at the base of the emitter follower [7006]. The filter circuit is effective, as pin 25 becomes an open collector output in playback mode, whose load impedance is determined by the de-emphasis circuit. Using a peaking stage, frequencies are raised by approx. 2 MHz (time constant pin 22).
The Y signal is then terminated, filtered by a low pass, and carried by a vertical noise canceller or dropout compensator. For this purpose, the Y signal leaves the IC [7005] (out: pin 42, in: pin 40) and is delayed by 1H in the IC [7003]. The CCD-1H delay line is effective for the Y signal first as a comb filter (vertical noise suppression) and secondly as a line storage device for the dropout compensation.
The subsequent switching stages are: The non-linear de-emphasis, horizontal noise canceller and the picture control switching to the increase in edge steepness (sharpness). The chroma signal is then added to the luminance signal and output as a FBAS signal (pin 38, VSB).

### 6.3.2 Chroma PAL

On pin 15, the FMPV signal is carried from the head amplifier to the IC [7005] signal electronics. From the FMPV signal the 627-kHz chroma signal is filtered using the internal low pass. The ACC amplifier amplifies and controls the chroma amplitude. To reduce the low frequency chroma flickering, an additional capacitor [2054,2056] is connected during playback for each video head. The switchover is carried out using the CROT control signal. During feature mode, no capacitors are connected (CAGC = High) to ensure fast chroma control.
In the main converter, the chroma signal is mixed with 5.06 MHz back to the original 4.43 MHz. The 5.06 MHz are produced in playback from the free-running quartz oscillator and from the (40+1/8) $f_H$ = 627 kHz frequency derived from the 321$f_H$-VCO. After the main converter, the chroma signal is mostly freed of crosstalk from additional traces using 2H comb filter [7003]. The chroma signal is then filtered using a band pass, checked by the color killer, looped through via pins 46 and 45 (or passed through the chroma noise reduction IC [7807]) and then added to the Y-signal.

#### 6.3.2.1 Chroma noise reduction

The amplitude and phase noise from the chroma signal is improved by the CNR-IC [7807]. The CNR-IC [7807] is a recursive comb filter comprising 2-line CCD and feedback loop. An accidental color shift is caused by the mean value generation across several lines. To prevent this color shift, the chroma noise reduction is switched off at vertical step changes (high on pin 17 [7807]). To detect vertical step changes, the Y signal (pin 42 [7005]) is compared to the Y-signal which is delayed by one line (pin 40 [7005]). The difference in levels is compensated using adjustment controller [3817]. The detection threshold is determined by the voltage fall at resistor [3806].
The chroma noise reduction only functions for PAL signals.

### 6.3.3 Chroma MESECAM DK

The signal path is virtually identical to the path for PAL.

**The differences are:**

- The 321 $f_H$ VCO is synchronised by the Sync.
- No phase rotation.
- The comb filter is not active.
- Internal band pass filters have a larger bandwidth.
- The control-µP generates the control signal for SECAM B/G via the IIC bus

#### 6.3.4 Chroma SECAM L

During playback, the FM signal from the band (FMPV) is carried to pin 23 [7066], amplified by 6dB, conveyed over the same band pass as for recording, and amplified again by 10dB. After pin 16, the NF pre-emphasis for recording is reversed. The anti-cloche switching in recording is used here as cloche switching.

In the following stages, the signal is adjusted (AGC) and the frequency of the signal is doubled. The band pass on pin 10 frees the signal from interfering harmonic waves, before the signal is doubled in frequency once more. So that the signal becomes a standard Secam chroma signal, it is provided with an HF pre-emphasis again (anti-cloche). Finally, the chroma signal runs through a color killer stage, a band pass filter and an emitter follower [7067], before it reaches pin 45 of the signal electronics 7005 IC as a CSP signal via a coupling capacitor.

#### 6.3.5 NTSC

During the playback of NTSC signals, the original NTSC chroma is converted into a PAL chroma signal (see above for control signals). This requires an IC-internal switchover in the chroma part, but also a switchover in the CCD-IC [7003] to a 1H comb filter to the crosstalk reduction (PAL 2 lines). Line and picture frequencies remain unchanged in accordance with the NTSC standard.

#### 6.3.6 PAL M,N

As for chroma PAL (7.3.2).

# 7. Input / Output (IO)

## 7.1 Video:

The entire video-I/O is carried out using the matrix switch STV6401 [7506], which is controlled by the controller via the IIC bus (SDA,SCL). To do this, the following signals are connected to STV6401 at the inputs: Front end video (VFV) pin 4, video in EI (VIN1) pin 6, video in E2 (VIN2) pin 8, video out (VOUT) pin 10 and front video (VFR) pin 12. The outputs OUT3/pin 15 and OUT2/pin 16 are fitted with a 6dB amplifier in the IC and convey the signal to the respective Scart socket. OUT1/pin2 has no amplifier; this signal (VBS) is passed on to the following parts of the circuit for further processing: VS, VS-Secam, VPO (VPS/PDC/OSD), Follow Me.

The VOUT signal is also passed to the modulator via emitter follower [7709].

## 7.2 Decoder operation (REC or E to E)

### 7.2.1 Program position with decoder (front end)

The front end signal (VFV or AFV1/2) is passed to the decoder connected to Scart 2 and from there, goes back to the VCR via VIN2 or AIN2L/AIN2R.

External input with decoder (7.2.2) is not possible for these program positions.

### 7.2.2 External input with decoder

The signal from Scart 1-In (normally TV set) is passed to the decoder connected to Scart 2. For scrambled programs, the decoder switches the pin 8 to high. The VCR then passes the decoded signal from Scart 2-In to Scart 1 Out.

# 8. Central control & deck electronics AI01, AI02, DE

## 8.2 SAA 1310 Interface drive electronics

### 8.2.1 CTL stage

The IC SAA 1310 contains a read/write stage for the CTL track with the option of overwriting an existing CTL track without any interference. The playback stage is fitted with a "digital" two-stage AGC. This logic circuit identifies the size of the output signal supplied by the CTL head, and then selects the best amplification ratio in the playback stage using comparators. The CTL head voltage can vary greatly due to the different tape speeds. The slowest tape speed is in LP mode. The highest speed is used during INDEX SEARCH. To ensure that the duty cycle in the tape sync is always reproduced correctly in the conditions mentioned above (important for detecting VISS marks), the amplifier must not be overdriven. The two-stage AGC alone cannot cover the large dynamic range of the input voltage. The amplifier is therefore also equipped with an internal low pass characteristic. Furthermore, the transistor [7442] is used to further reduce the amplification for all WIND modes. In this case, the signal IWIND ="L" and T7442 are blocked. If T7442 is blocked, the amplification is mainly determined by the internal negative feedback resistors on the SAA 1310, [7443] and the external resistor pos. 3373. The CTL head signal amplitude in SP is approx. 1 mV pp (typ.). The polarity of the playback amplifier can be switched over using line VISS (Video Index Search System). This is the only way it is possible for the µP to write a VISS mark onto the tape without spikes. The Write/Read (W/R) signal is used to switch over between record and playback: W ="H", R ="L".

### 8.2.2 POR (Power On Reset) - generator

The POR generator contained in the SAA1310 [7443] only requires one external capacitor [2476], which specifies the length of the POR pulse. For 33 nF, tPOR is approx. 30msecs. The response threshold of the reset circuit lies between 4.5 and 4.8 V. Supply fluctuations which are shorter than tPOR/100 area and which do not fall below 3.5 V, do not trigger the POR. The operation-µP and the control-µP are reset using the inverted POR.
There is an additional line which runs from the control-µP to the operation-µP (IDC-RESET) which can reset the operation-µP.

### 8.2.3 The sensor interface

The four comparators in the SAA1310 [7443] are used to convert sensor signals to the logic level. Two of these comparators have open collector outputs (pins 11 and 13), which can switch a current of 100 mA. The outputs are overload protected by a current limiter and thermal shutdown. Only the non-inverting input on each comparator is accessible from the outside. The other inputs are connected to an internal reference of nom. 2.5V. The fixed hysteresis of the comparators of approx. 10 mV is also located internally. The sender diodes on FTA and WTR are supplied with a pull-up.

### *The comparators are connected as follows:*

**Comparator 1:**
In = FTA, pin 5; Out = FTAD, pin 15:
FTA = threading tachometer. This signal comes from a forked light barrier in the deck. An infra-red light beam is interrupted by a 4-blade impeller (butterfly). For a correct evaluation, the output amplitude of the photoelectric barrier must fluctuate at least between the voltage levels 1.5 V and 3.5 V. An additional hysteresis is created with a resistor.

**Comparator 2:**
In = WTR, pin 6; Out = WTRD, pin 14:
WTR = Winding tachometer right, from a reflection photoelectric barrier. The level is the same as for the FTA.

**Comparator 3:**
In = WTL, pin 7; Out = WTLD, pin 13:
WTL = Winding tachometer left, from a reflection photoelectric barrier.
The level is the same as for the FTA.

**Comparator 4:**
In = FG, pin 8; Out = FGD, pin 11:
FG = capstan tachometer. This signal stems from an amplifier for the tachometer hall sensor on the motor unit. The output impedance is 10 kOhm. The amplitude of the near sinusoidal signal is normally 1 Vpp . It should not fall below 300 mV PP. It is AC-coupled via a capacitor [2490]. In order for a bias current to flow, the input pin 8 must be passed via a resistor [3378] to the reference voltage on pin 3. A capacitor [2474] for filtering out high-frequency interference is arranged in parallel to the bias resistor.

## 8.3 Interface to head drum motor driver

The head drum control voltage (speed and phase control information) is output via a µP-output (7406/pin 87; PWM 14-bit). This pulse-wide modulated signal is fed to the head drum motor driver IC TDA5241 (7446/pin 13) and integrated with the capacitor [2492]. This IC already has a completely integrated 'start-up' circuit fitted. For the commutation, the head drum motor driver uses the electromagnetic energy (EMF) on the non-current carrying motor coil (transformer principle). The motor speed is also discharged from there at the same time. The phase of the head disc is discharged from a position coil. Speed and phase are multiplexed into one signal (PG_FG, 7446/ pin 6). During this process the falling edge of the signal is the speed (FG/ 450Hz) and at 25Hz the position pulse (PG) has a positive edge.

The connection from the HMO driver TDA5241 [7446] on the motherboard to the head drum motor is made using plug connector 1948.

The current input from the +14VM1 is normally 70mA at room temperature. During acceleration of the motor, approx. 0.5A may flow for a short period.

## 8.4 Interface to the capstan motor

The driver IC on the capstan motor is activated via connector 1946.

CAP is the signal for the capstan speed. This voltage may vary without load between 0 and 5 V. The rotational direction of the motor is determined using CREV (capstan reverse). The maximum current input for the motor is limited to 1A. Typical values in PLAY mode are 0.2 ... 0.3 A.

## 8.5 Loading motor driver

The TMO driver uses a bridged dual power op-amp L2722. The element can supply +/-1 A output current. It contains short-circuit and thermal overload protection and integrated flyback diodes on the outputs. The output current is limited to approx. 0.7A by the internal resistance of the loading motor (18 Ohm typ.) (start-up or motor is blocked). Between the IC outputs (pins 1 and 3), a "Boucherot" circuit (1 Ohm, 100 nF) suppresses a spurious 3MHz oscillation from the output stage. One half of the bridge is controlled via the TMO line and acts as a comparator. The other half is an amplifier integrator with a 3.9 gain. A change in the input voltage (THIO) of between 0 and 5V results in a change in the output voltage of between 0V and almost Ub. With 50% modulation (THIO = 2.5 V) pin 3 has approx. 7 V. The capacitor in the negative feedback of the op-amp filters out the PWM frequency of approx. 39kHz. During POR, the µP issues "L" to the THIO line, whilst TMO is "H". In order to ensure that no current flows in the motor during the POR pulse, the aforementioned polarity must be maintained. This prevents the motor being destroyed in case of prolonged running or blockage. This circuit, however, also has the disadvantage that if the 5 V supply fails (e.g. because the 5V fuse has blown), residual voltages may be passed to the IC inputs via the adjacent 14 V voltages. These residual voltages trigger the comparator and the op-amp is opposite ways, causing a short-circuit in the blocked loading motor after one minute. In order to avoid this, a separate voltage divider [3385,3382] is used for the comparator. Both output on the L2722 [7440] are then in "common mode" if this error occurs.

## 8.6 Analog interface to the µC

**The following analog levels are supplied to the µC's internal A/D converter:**

| | |
|---|---|
| TRIV | Tracking Information Video |
| TAE/TAS | Tape End / Tape Start Detection |
| INIT | INITialisation (drive switch) |
| RECP | RECord Protection (drive switch) |
| AGC | Automatic Gain Control (front end) |
| TRIA_ALM | Tracking information audio/ audio level information |

## 8.7 Tape end - LED control

The LED current is switched using transistor at pos. 7407. The ON time is approx. 1 msec with an ON/OFF ratio of 0.09.
The LED current is normally 180 mA. In order to prevent interference from the relatively high pulsed current 'spreading' through the entire unit, the LED is fed from the 14VM1, and filtered by 2 NFRs (Non Flammable Resistor) [3426,3431] with 10 Ohm each and a 220µF electrolytic capacitor [2406].

## 8.11 EE-PROM

The R/W cycle is carried out via the fast IIC bus SDA3, SCL3. In the EEPROM, parameters specific to the device or the deck are stored, together with the preset stations and some options.

The head changeover position is adjusted automatically with a test cassette in the service test programme.

## 8.12 CMT detection (video detection)

This has been extended due to identification problems with weak transmission signals and video signals not conforming to the STANDARD (common channel interference). The CSYNC line is supplied to the µP on pin 33. A hardware integration of the picture pulse compensates the interference generated by the common channels and weak signals.

## 8.13 Micro-controller (TMP93C071 F)

The micro-controller (7406) is a high-speed 16-bit micro-controller (ROMless) combines the following functions:

- external ROM range of 16Mbyte, addressable
- 8 Kbytes internal RAM
- 8-bit A/D converter (16 channels)
- serial bus interface: - 2 serial, 2 IIC bus, 1 UART (RXD/TXD) PWM outputs: - 3 x 14bit, 9 x 8bit
- composite sync input - special servo inputs

The component is used in QFP (120 pin).

There are 16 analog inputs available. The resolution of the A/D converter is 8 bit. The maximum input voltage range which can be processed is 0 ... 5V (determined by the reference voltages ADREF pin12 and ADGND pin13).

12 analog/PWM outputs - 3 with 14-bits and 9 with 8 bit resolution, are available. The outputs supply a signal with a constant frequency (approx. 39kHz) and a variable duty cycle.

## 8.14 External RAM CY62256 (7452)

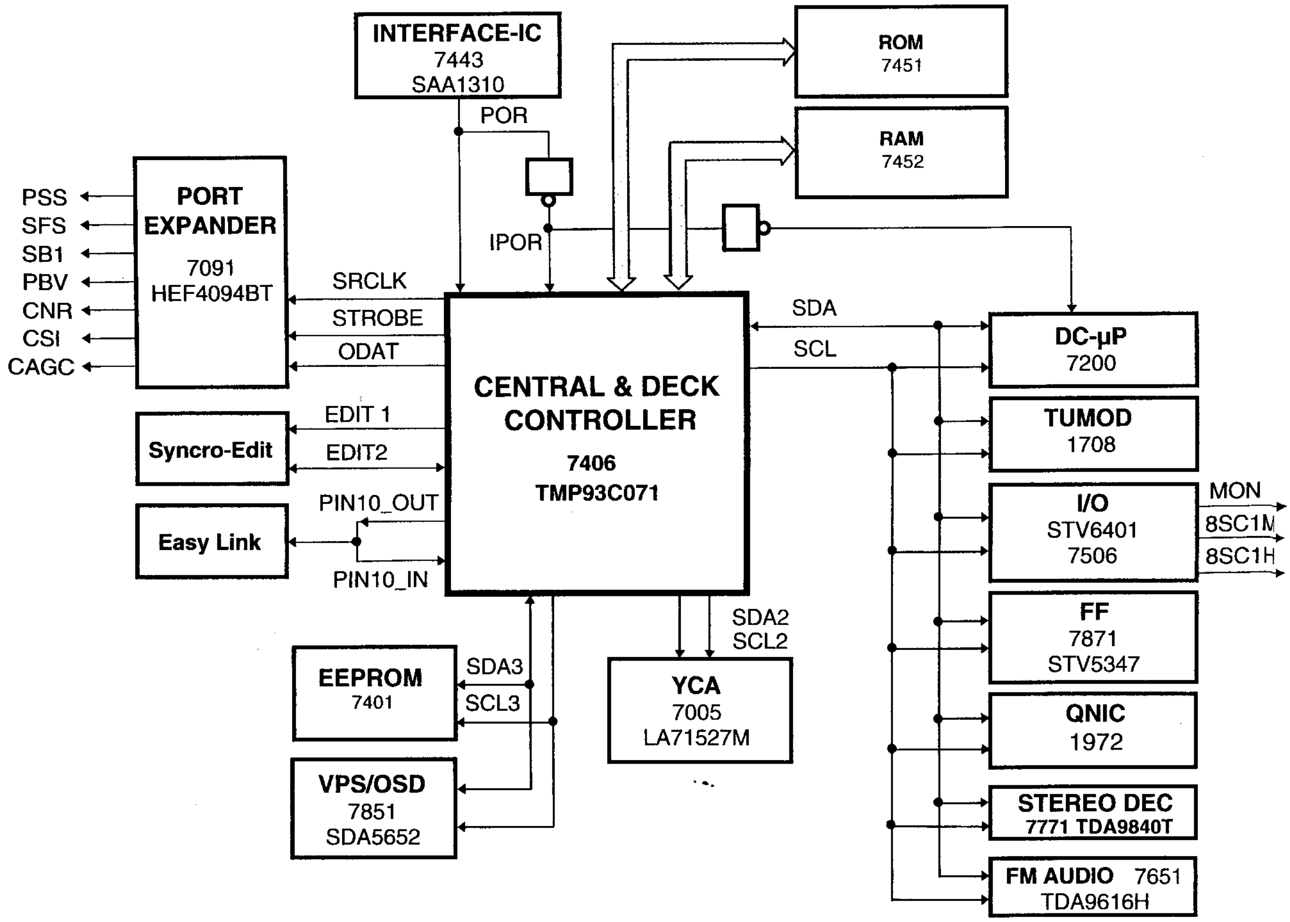
Currently, an external RAM of 256kBit (22k x 8bit) in size is being used.

## 8.15 External ROM M27C4001 (7451)

Current external ROM of 4Mbit (512k x 8bit) requires a specified access time of ≤ 100ns.

## 8.16 Port expander PE

The shift register [7091], is controlled by the control-µP via the lines SRCLK, ODAT and STROBE, and is used as the port expansion for the microprocessor.


INTERFACE-IC
7443
SAA1310
POR
IPOR
ROM
7451
RAM
7452
PSS
SFS
SB1
PBV
CNR
CSI
CAGC
PORT EXPANDER
7091
HEF4094BT
SRCLK
STROBE
ODAT
CENTRAL & DECK CONTROLLER
7406
TMP93C071
SDA
SCL
DC-µP
7200
TUMOD
1708
I/O
STV6401
7506
MON
8SC1M
8SC1H
FF
7871
STV5347
QNIC
1972
STEREO DEC
7771 TDA9840T
FM AUDIO 7651
TDA9616H
Syncro-Edit
EDIT 1
EDIT2
Easy Link
PIN10_OUT
PIN10_IN
EEPROM
7401
SDA3
SCL3
VPS/OSD
7851
SDA5652
SDA2
SCL2
YCA
7005
LA71527M

### 8.17 Easy Link (P50)

For the communication between the TV set, video recorder and the peripheral devices, a bi-directional single-wire bus is used, which runs via pin 10 to Scart socket 1. In connection with the Scart connection on pin 8, various video recorder functions activate actions on the TV and vice versa.

## 9. Follow Me part (FOME)

The video signal from the internal front end of the VCR (VFV) and the VBS signal, which, when compared, corresponds to the TV front end video signal connected to Scart 1-Input (VIN1; i.e. the input selection switch in the I/0 on In2 pin 6/VIN1), are „digitised" via comparators and are then compared. Low at the output of the circuit (FOME signal - 0.8V) shows that the picture contents of both video signals are identical and that both receiver parts (TV & VCR) must be tuned to the same station (possible errors in detection may occur with similar signals, e.g. news programmes).

## 10. VPS/PDC, on-screen display VPO

### 10.1 General

The combo-IC SDA5652 [7851] contains both a data slicer for VPS/ PDC decoding and the entire on-screen display function. The IC is controlled via the fast IIC bus (approx. 330kHz/ SCL3 or SDA3). As, during the current production runs, the IC is being changed to a type with integrated H-PLL, it is possible to differentiate both variants using a readable register (version no.: processed in the software).

### 10.2 PDC/VPS

The VPS/PDC decoder part on the SDA5652 [7851] reads from the vertical blanking gaps and the VPS and the PDC data and stores this information in the IC's internal RAM (read out by the controller via the IIC bus). The time can also be read from the TXT header line (required for "Time download"). The date is not called up from the TXT header, but only via PDC format-1 (various write versions of the preset stations).

As the input signal for the data extraction, the video signal from input selection switch (VBS) is connected from the I/0 to pin 17 on the IC via a coupling capacitor.

**The following modes (data formats) are identified:**

- VPS (Timer data and sender name)
- PDC Format 2 (Timer data and station name)
- PDC Format-1 (station name and date and possibly time)
- TXT header line (time for 'Time Download')

### 10.3 OSD part

The VPO-IC SDA5652 facilitates both the generation of the keyboard matrix into a video signal and the generation of an entire picture (full page) for menu-control or if no background video is available.

The video signal VSB passes from the signal electronics to the input on the OSD-IC (pin 18). From output (pin 15), the signal is conveyed via emitter follower [7854, 7855] and the low pass filter in-between [5854, 2864, 2865] as VOUT signal to the I/0 or modulator. The low pass has a limit frequency of approx. 8MHz and is used to suppress harmonics which are produced by the OSD part (bandwidth limit for the video signal).

As the system clock frequency, the doubled color subcarrier oscillation from the signal electronics is used (2FSC/8.86 MHz) which is connected via a selective emitter follower [7002] at pin 3 on the IC. For the vertical synchronisation of the keyboard matrix, an OSD frame pulse (OFP) is generated by the controller and passed to the IC on pin 9. The horizontal arrangement is made on pin 7 on the IC via an H-sync which is separated out from the video signal. In the case of the keyboard matrix in Secam signal, a bypass is activated between video-in and video-out via a switch inside the IC and a series resonant circuit [5852, 2857]. So that the keyboard matrix remain stable and readable with slightly distorted video signals (noise, common channel, trick play mode .. ), an H-PLL is required for the horizontal synchronisation. As the internal H-PLL has not functioned perfectly in the first OSD-IC version, the H-sync required is generated from the VSB signal using the PLL-module BA7046F [7857]. The free-running frequency in the H-PLL is determined by resistor [3884] (130 kOhm/±2%) and is approx. 15kHz. This H-sync is available on pin 2 on the PLL-IC, and is connected directly to pin 7 on the OSD-IC. The VSB signal is attenuated by 6dB using an emitter follower or limited to a band of approx. 500kHz [7856, 3881, 3882, 2868] and connected to a coupling capacitor [2869] on pin 6.
With the improved/second OSD-IC version (transfer is currently in production), the horizontal sync pulse is generated by the IC itself via an internal sync-separator and then a connected internal H-PLL from the signal (VBS) connected to pin 17. When using this OSD-IC type, the external PLL (BA7046F [7857]) including peripheral circuits is no longer required.

During full-page OSD (menu, no video signal, ...) neither a vertical-sync (OFP) nor an H-sync is required, as in this mode, the OSD-IC generates everything from the system clock frequency, i.e. from the 2FSC signal.

## 11. NICAM decoder SAA 7283/84ZP - QNIC

The IC SAA7284 is an NICAM decoder which does not require any adjustment. It is arranged on the sub-printed board QNIC. The NICAM signal is filtered out by internal filters and is converted into the basic band. The signal is then demodulated and decoded. The digitised audio signal is converted into an analog signal via a D/A converter. In addition to the NICAM decoding, an audio switch is available (inputs pin 7, 16) via which the internally demodulated or external audio signals can be selected.

This switch is used to switch over to the FM audio or AM sound with SECAM L/L' in case of incorrect NICAM decoding or a NICAM carrier not being available.

Two low passes with an amplification of approx. 6dB are connected to the output which remove the residual carriers from the audio signal.

## 12. Operating unit DC

The front controller [7200] is the core element of the operating unit, fulfilling the following tasks with the respective functional groups:

- shuttle evaluation
- evaluation of the keyboard matrix
- decoding the remote control commands from the infra-red receiver pos. 7220
- quartz clock
- integrated RAM to store timer data
- activation of the display
- 12C bus interface (SDA pin 20, SCL pin 21) to the motherboard

In case of a power failure, the back-up cell on pin 33 supplies the clock and the RAM corresponding to the value of 2200 (220mF gold capacity ... 7 hours). A diode [6200] prevents the back-up cell from discharging. During this time, pin 2 is at LOW level, so that further functions on the IC are switched off using the system quartz [1261] at pin 13 / 14.

### 12.1 Shuttle:

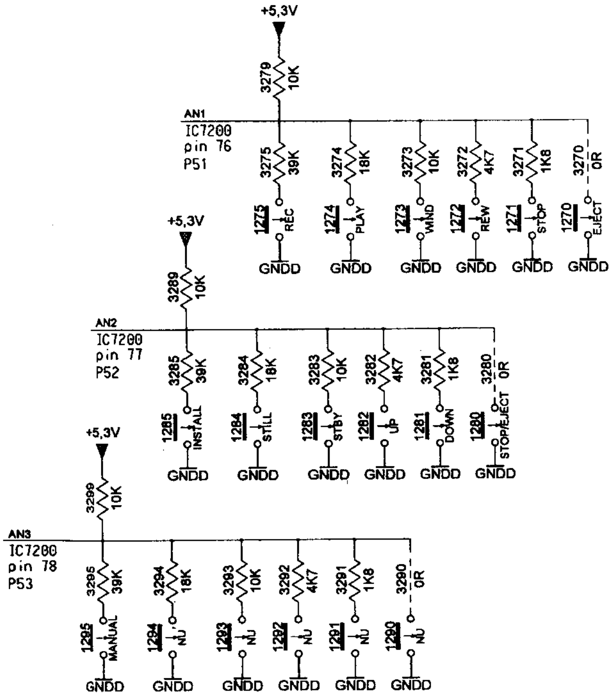
The shuttle EVQ WMH001 represents a binary coded rotary switch with a rotation angle of +/- 70 degrees and 16 switch positions. A spring returns it to the centre position once released. From this position, it can be moved in both directions by 7 or 8 switch positions. All switching conditions are realised using the various electrical connections for the four different shuttle outputs B1 - B4 with a voltage of 5VD (level lift 0V/5V). These shuttle signals are read and evaluated on the input ports P40, P41, P42, P43 on the front controller.

## 12.2 Evaluation of the keyboard matrix:

There are 18 different keys which are decoded by 3 ports (P51, P52, P53) via 6 assigned DC values each. Pressing keys simultaneously may lead to undesired functions.

Critical functions such as RECORD and INSTALL cannot be activated accidentally by pressing more than one key at the same time.

Schematic:



## 12.3 IR receiver and signal evaluation

The IR receiver [7220], which is only operational if the voltage 5VD is present, contains a selectively controlled amplifier and a photo-diode. The photo-diode changes the received transmission (approx. 940nm) in electrical pulses, which are then amplified and demodulated. On the output of the IR receiver [7220], a pulse sequence (level lift 0V/5V), which corresponds to the envelope curve of the received IR remote control command, can be measured. This pulse sequence is read into the front controller via the interrupt input P30/INT3 for further signal evaluation.

## 12.4 Generating the clock pulse

In the operating modes NORMAL, LOW POWER, STANDBY and MAINS OFF, the front controller and the sub-oscillator [1262] generate the clock pulse as the basis for the internal clock and date function. At port P22/XTOUT, a sinusoidal oscillation of 32.768kHz, with a level of approx. >3 Vpp can be measured with a 10:1 probe.

With the back-up capacitor [2200] fully charged, the back-up time is 7 hours.

## 12.5 Activation and function of the VFD display

In principle, the VFD display [7202] is a tube triode in which the heating filaments in the tube serve as cathodes (F1,F2). The activation of the 9 VFD grid (G1 - G9) is carried out via P67 - P77 on the front controller, and that of the 18 anodes (P1 - P18) via ports P80 - P87 and P90 - P97 on the front controller, each with a positive potential compared to the cathode. The anode P17 and P18 are activated statically from port 06 (pin 31) and port 07 (pin 32) via transistors 7242 and 7243.

The grids and anodes (digits and symbols to be displayed) are activated in the time-multiplex procedure (duty 1:10, scanning period 2.11 ms (9 x 235 µs), voltage lift 5V/-28V). A dimmer function is realised using pulse-width modulation of the grid-activation signals. At maximum display brightness, the pulse-width for each grid is 214 µs. With the help of software, this can be reduced in several stages to approx. 30 µs, which visually reduces the brightness of the VFD display accordingly.

A digit or symbol is only illuminated if the corresponding anode and the surrounding grid are switched simultaneously to 5V for a certain time within a scanning period. The electrons emitted from the cathode are accelerated by the positively charged grid and hit the luminous layer of the anode which is also positively charged.

During the remainder of the scanning period, the corresponding grid and parts of the anode are at -28V, due to the internal pull-down resistors in the front controller. This potential is still lower than the average cathode potential of approx. -16V, prevents the acceleration of electrons, thus causing the relevant grid and anode segments to go dark.

The heating voltage for the display is derived from the 14VDC voltage in the power supply. An AC voltage is generated via a chopper on the motherboard. This is passed via lines HEHI and HELO, on to the limit resistors [3257,3258, 3259) and the interference suppression coil [5001 ] at pins F1 and F2 in the VFD display. The Z -diode [6250] terminates the heating voltage via a resistor [3250] to approx. -16V. Measure directly between the pins F1 and F2, the heating voltage is normally +3.5Veff.

## 12.6 Headphone amplifier (ACP3)

The IC TDA7053A is used as the headphone amplifier. However, the bridge amplifier function on this IC is not used. The output voltage on the IC is limited to around 100mA per channel.

The volume is set using a PWM output on the microprocessor. The PWM signal, filtered via the filter switch, is present as a DC voltage on pins 2 and 8, whereby voltages under 0.3V switch the headphone output to mute. The maximum volume is reached at around 1.2V.

## 12.7 Microphone amplifier

A two-stage transistor switch forms the microphone amplifier. The amplification for the first stage is around 35dB (at a source resistance of 600Ohm). The second stage amplifies by around 27dB.

# PRINTED CIRCUIT BOARDS

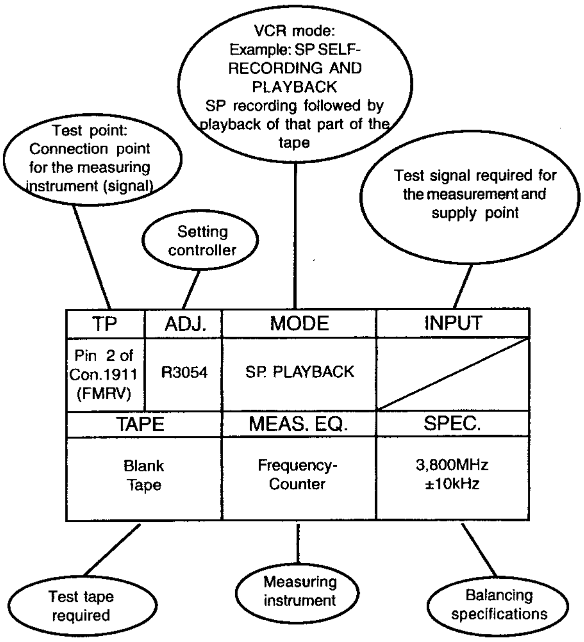
## Instructions for electrical balancing

## Measuring instruments

1. Dual trace oscilloscope
   Voltage range :0.001 ~ 50 V/div
   Frequency :DC ~ 50 MHz
   Probe :10:1, 1:1
2. Digital voltmeter (DVM)
3. AF millivoltmeter
4. Frequency meter
5. Sine-wave generator
   Sine-wave : 0 ~ 50 MHz
6. Test pattern generator with stereo modulation
7. VHS alignment tape 4822 397 30103

SPC alignment tape 4822 397 30268

## Key to the balancing guidelines:


VCR mode:
Example: SP SELF-RECORDING AND PLAYBACK
SP recording followed by playback of that part of the tape
Test point: Connection point for the measuring instrument (signal)
Setting controller
Test signal required for the measurement and supply point
TP
ADJ.
MODE
INPUT
Pin 2 of Con.1911 (FMRV)
R3054
SP. PLAYBACK
TAPE
MEAS. EQ.
SPEC.
Blank Tape
Frequency-Counter
3,800MHz ±10kHz
Test tape required
Measuring instrument
Balancing specifications

⊤ ... antenna input

AV ... Euro AV-socket (Scart)

## 1. Power supply ASM (PS)

### 1.1 Setting the output voltage +5A (3179):

*Purpose:* Set supply voltage to the correct value.

*Indications of incorrect setting:*
The VCR functions will not work correctly.

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 1115/3,4 | R3179 | Playback | |
| **TAPE** | | **MEAS. EQ.** | **SPEC.** |
| Any tape | | DC Voltmeter | 5.35V ± 0.05V |

## 2. Front end (FE)

*Servicing work after replacement:*

– on the IC 7705: 2.1, 2.2, 2.3, 3.1, 3.2
– on the tuner/modulator: 2.2

### 2.1 AFC adjustment for PAL (5702)

*Purpose:* Correct setting for the demodulator AFC circuit

*Indications of incorrect setting:*
Poor or distorted reception from TV stations.

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 7705/20 | 5702 | E to E | 38.9MHz, 240mV$_{pp}$<br>at 7702/17;<br>no antenna input |
| **TAPE** | | **MEAS. EQ.** | **SPEC.** |
| | | DC Voltmeter,<br>Frequ. Generator | 2.5V ± 0.2V |

### 2.2 Setting the HF-AGC (3722)

*Purpose:* To set the "take-over point" on the Hf-AGC

*Indications of incorrect setting:*
AGC does not synchronise correctly if the input level is too weak. If the level is too high, the picture may be distorted.

*The following preparations should be carried out before the setting:*

– the device should be at operating temperature

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| TUMOD<br>Pin 17 | AGC-ADJ<br>R3722 | E to E | ⊤<br>5mV (74dB$_{\mu V}$)<br>PAL white picture,<br>CH27 (519.25),<br>audio IF on, no<br>audio modulation |
| **TAPE** | | **MEAS. EQ.** | **SPEC.** |
| | | Oscilloscope<br>(10:1 probe)<br>Video Pattern<br>Generator | 550mV$_{pp}$ ± 50mV |

### 2.3 AFC adjustment for SECAM Band I (3702)

*Purpose:* Correct setting of the demodulator AFC circuit

*Indications of incorrect setting:*
Poor or distorted reception of TV stations.

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 7705/20 | 3702 | E to E,<br>SECAM L' tuned on preset! | 33.9MHz, 240mV$_{pp}$ at 7702/17;<br>no antenna input |
| TAPE | | MEAS. EQ. | SPEC. |
| | | DC Voltmeter,<br>Frequ. Generator | 2.5V ± 0.2V |

### 2.4 40.4 MHz suppression (5704)

*Purpose:* Suppression of residual band I carriers.

*Indications of incorrect setting:*
Poor picture quality if the filter is suppressing the picture carrier.

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 1702/1 | L5704 | E to E | 40.4MHz, 240mV$_{pp}$ at Tuner pin 17;<br>no antenna input |
| TAPE | | MEAS. EQ. | SPEC. |
| | | Oscilloscope,<br>Sinus Generator,<br>Counter | minimum |

## 3. Stereo decoder (FM_STEREO)

### 3.1 Setting the level for the stereo decoder

*Servicing work after replacement:*
– on IC 7771, 7705: 3.1, 3.2

*Purpose:* Control the amplification on stereo decoder 7771

*Indications of incorrect setting:*
Increased noise or overriding of the sound

*The following preparations should be carried out before the setting:*
– Call up the Service Test program (hold down the "STOP" button on the remote control and the "PLAY" button on the device at the same time for 5s.)

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| Scart Audio Output (Pin 1) | UP/ DOWN | Service Mode, Step 60 | ⊤<br>Test picture, **Dual Mode** 1kHz, ±27kHz deviation, only on Language II |
| TAPE | | MEAS. EQ. | SPEC. |
| | | AC Millivoltmeter<br>Video Pattern Generator | 500mV$_{rms}$ ± 50mV, refer to description below |

- Connect the millivoltmeter to Scart 1, pin 1
- Set the amplitude to the required value by pressing the UP (+) or DOWN (-) buttons
- After exiting using SELECT, the value will be stored in the EEPROM.

### 3.2 Channel separation in the stereo decoder

*Purpose:* Prevent crosstalk in the sound channels

*Indications of incorrect setting:*
Crosstalk in the sound channels

*The following preparations should be carried out before the setting:*

- Call up the Service Test program (hold down the "STOP" button on the remote control and the "PLAY" button on the device at the same time for 5s.)

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| Scart Audio Output (Pin 3) | UP/ DOWN | Service Mode, Step 61 | ⊤ Test picture, 1kHz sound **only** on **right** channel (Stereo Mode) |
| TAPE | | MEAS. EQ. | SPEC. |
| | | AC Millivoltmeter<br>Video Pattern Generator | minimum value, refer to description below |

- Connect the millivoltmeter to Scart 1, pin 3
- Set the noise amplitude to the smallest value by pressing the UP (+) or DOWN (-) buttons
- After exiting using SELECT, the value will be stored in the EEPROM.

## 4. Erase oscillator (ER)

### 4.1 Erase frequency for the main erase oscillator (5641)

*Purpose:* Set the correct erase frequency for recording

*Indications of incorrect setting:*
Erase frequency (or harmonics from it) produces interference in the audible range

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 1964/1 | 5641 | Record | |
| TAPE | MEAS. EQ. | | SPEC. |
| Any Tape | Frequency Counter | | 70kHz ± 10kHz |

## 5. Audio linear (AL)

Servicing work after replacement:
– on IC 7005: 5.1
– on the combo-head: 5.1, 5.2, 5.3

### 5.1 Audio linear playback level

*Purpose:* Set the playback level in the audio linear part

Indications of incorrect setting:
The playback is too quiet or overridden

*The following preparations should be carried out before the setting*

- Apply a sine-wave of 1kHz; 500 mVeff to Scart 1 (pins 2 and 6)
- SP Record from Scart 1
- Call up the Service Test program
- Play back the recording
- Call up step 62; after calling this up, the linear sound will be present on the output

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| AV1 (Pin 1 or 3) | UP/ DOWN | Service Mode, Step 62 | 500mV$_{rms}$ 1kHz |

| TAPE | MEAS. EQ. | SPEC. |
|---|---|---|
| Any Tape | AC Millivoltmeter, Frequency Generator | 500mV$_{rms}$ ± 50mV refer to description below |

Set the level to the required value using UP / DOWN.
The values set are stored in the EEPROM.

### 5.2 Erase frequency in the audio erase oscillator (5602)

*Purpose:* Set the correct erase frequency for 5.2

*Indications of incorrect setting:*
Erase frequency (or harmonics from it) produces interference in the audible range

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 9603 | 5602 | Record | |

| TAPE | MEAS. EQ. | SPEC. |
|---|---|---|
| Any Tape | Frequency Counter | 70kHz ± 10kHz |

### 5.3 Magnetic biasing current (BIAS, 3626)

*Purpose:* Set optimal magnetic biasing current.

*Indications of incorrect setting:*
If the level is too high, the frequency response becomes poor. If the level is too low, the harmonic distortion is increased.

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 3626, BIAS1/2 (differential measurement) | BIAS R3626 | Record | White picture |

| TAPE | MEAS. EQ. | SPEC. |
|---|---|---|
| Any Tape | Millivoltmeter Video Pattern Generator | 7mV$_{rms}$ ± 3mV$_{rms}$ |

*Checking the 'Bias' setting:*

After the 'Bias' has been set to the specified value, record some music, play it back, and move the audio switch to the 'MONO' position.
Use cassettes from well-known manufacturers, but not chrome dioxide tapes.
Check that the treble is played back sufficiently well, and that the tone is not distorted. If there is too much treble, the 'Bias' current should be reduced slightly. If the distortion is too great, the 'Bias' current should be increased.

## 6. FM audio (AF)

*Servicing work after replacement:*
– on IC 7651: 6.1

### 6.1 Bargraph level

*Purpose:* Correct bargraph level displayed for the audio control

*Indications of incorrect setting:*
Bargraph level is displayed incorrectly depending on the device tolerances.

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| | | Service Mode | AV1 Pin 2 & 6<br>500mV$_{rms}$, 1kHz |

| TAPE | MEAS. EQ. | SPEC. |
|---|---|---|
| | AC Millivoltmeter, Frequency Generator | Call up Step 63 |

After calling up step 63, the adjustment is made automatically.
If the adjustment has been carried out successfully, "OK" will appear on the display.
If one of the audio levels measured by the microprocessor is outside the permissible limits, "ERR" will appear.

The values set are stored in the EEPROM.

## 7. Head amplifier (HA)

Servicing work after replacement:
– on IC 7005 (VS): 7.1

### 7.1 Setting the PAL chroma write current (3118):

*Purpose:* Set the optimal chrominance level for recording

*Indications of incorrect setting:*
If the level is too high, the picture may be distorted.
If the level is too low, the colour may be too weak.

*The following preparations should be carried out before the setting:*

- Remove the drive
- Connect the emitter and the collector on 7008

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| R3118 (slider) | R3118 | Step 10 of Service Mode; Record | Red Picture PAL 75% Saturation |

| TAPE | MEAS. EQ. | SPEC. |
|---|---|---|
| | Oscilloscope Video Pattern Generator | 420mV$_{pp}$ ± 40 mV$_{pp}$ |

Disconnect the emitter and collector on 7008.

## 8. SECAM L chroma processing (VS_SEC)

*Servicing work after replacement:*

- on IC7066: 8.1

### 8.1 SECAM chroma write current (3076):

*Purpose:* Set the optimal chrominance level for recording

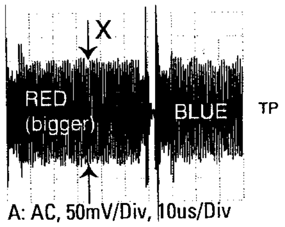
*Indications of incorrect setting:*
If the level is too high, the picture may be distorted.
If the level is too low, the colour may be too weak.

*The following preparations should be carried out before the setting:*

- Remove the drive
- Connect the emitter and the collector on 7008

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| R3076 (slider) | R3076 | Step 10 of Service Mode;<br>Record | ⊤<br>Red Picture SECAM 75% Saturation |
| TAPE | | MEAS. EQ. | SPEC. |
| | | Oscilloscope<br>Video Pattern Generator | $210mV_{pp}$<br>$\pm 30\ mV_{pp}$ |

Disconnect the emitter and collector on 7008.



## 9. Video signal processing (VS)

*Servicing work after replacement:*
- on IC 7103 (HA), the head disc, the motherboard: 9.1
- on IC 7003, 7005: 10.1

### 9.1 Studio picture control SPC

*Purpose:* Set the reference level for the SPC

*Indications of incorrect setting:*
"Strays" may occur or the picture may be played back with a lower resolution than might be possible

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| | | Service Mode | ⊤ or (AV)1<br>black picture, no BURST |
| TAPE | | MEAS. EQ. | SPEC. |
| SPC Alignment Tape | | Video Pattern Generator | Call up Step 52 of Service Mode |

The automatic adjustment procedure is started by activating step 52.
If the adjustment has been carried out successfully, "OK" will appear on the display. If the adjustment was incorrect, "ERR" will be displayed.
The values set are stored in the EEPROM.

## 10. Chroma noise reduction (CNR)

*Servicing work after replacement:*
- on IC 7003, 7005, 7801, 7804: 10.1

### 10.1 Amplifying the non-correlation detector (3817)

*Purpose:* Set the amplification of the 'non-correlation detector'

*Indications of incorrect setting:*
Poor chroma performance during playback

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| Collector 7801, 7804 | 3817 | Playback | |
| TAPE | | MEAS. EQ. | SPEC. |
| Prerecorded Tape | | Oscilloscope | adjust to same level |

## 11. Deck electronics (DE)

*Servicing work after replacement:*
- on the motherboard, the head disc: 11.1, Electro-mechanical adjustments in chapter 4

### 11.1 Vertical head change-over position

*Purpose:* Specify the head change-over position during playback.

*Indications of incorrect setting:*
Errors in head change-over and/or vertical picture flickering.

*The following preparations should be carried out before the setting:*

- Insert a test cassette with a standard video signal (e.g. 4822 397 30103)
- Call up the Service Test program

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| | | Service Mode | |
| TAPE | | MEAS. EQ. | SPEC. |
| VHS Alignment Tape | | | Call up Step 51 of Service Mode |

After the adjustment has been made, the device switches to "STOP" mode and displays "OK".

If the adjustment has not been made correctly, the device displays "ERR".
This may be caused by the following:
There is an error in the standard video signal, the scanner is defective or the microprocessor is defective

The values set are stored in the EEPROM.

## 12. Display control (DC)

*Servicing work after replacement:*
- on clock quartz: 12.1

### 12.1 Clock frequency

*Purpose:* Set the precise clock frequency

*Indications of incorrect setting:*
The clock loses or gains time

*The following preparations should be carried out before the setting:*

- Call up the Service Test program, select step 99
  After calling this up using Select, the display is switched to dark and it is not possible to operate any functions on the device.
- Measure and note down the frequency on pin 13 from connector plug 1944 to 7 digits (should be approx. 2048 Hz)
- Exit step 99 by resetting the power supply

| TP | ADJ. | MODE | INPUT |
|---|---|---|---|
| 1900/2 | | Service Mode, Step 53 | |
| TAPE | | MEAS. EQ. | SPEC. |
| | | Frequency counter with 7 digits | refer to description below |

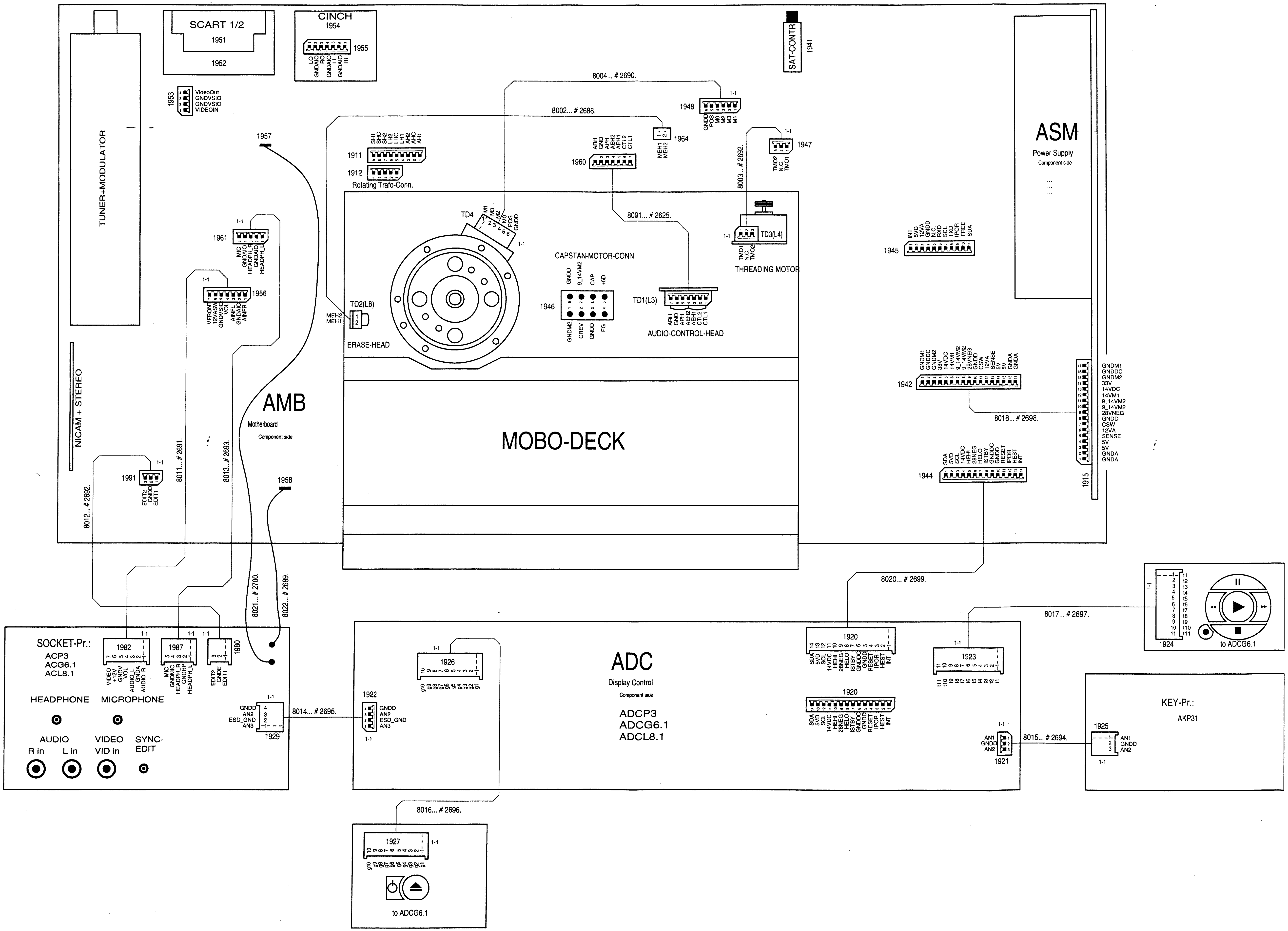
- Call up step 53 of the Service Test program;
  the display should show '--:--:53'
- by the help of the remote, type in the last 4 digits of the measured frequency
  e.g. measured frequency =2048.123 - input 81:23
- Press the 'OK' button;

The microprocessor calculates a correction factor for the clock frequency from the value entered.
If the frequency entered is outside certain limits, 'ERR' will be shown on the display.

# List of Signal Abbreviations

| | |
|---|---|
| 2FSC | 2x Colour subcarrier |
| 10SC12 | Scart 1/2 Pin 10 |
| 8SC1 | Scart 1 pin 8 input |
| 8SC1H | Scart 1 pin 8 high level |
| 8SC1M | Scart 1 pin 8 medium level |
| 8SC2 | Scart 2 pin 8 input |
| 9_14VM2 | Capstan motor supply, switched |
| A0-19 | Adress lines |
| AEH1/2 | Audio erase head |
| AF1 | Audio from frontend, left |
| AF2 | Audio from frontend, right |
| AFC | Automatic frequency control |
| AFE | Audio from frontend |
| AGC | Automatic gain control |
| AH1/2/C | Audio heads |
| AIN1L | Audio input scart 1, left |
| AIN1R | Audio input scart 1, right |
| AIN2L | Audio input scart 2, left |
| AIN2R | Audio input scart 2, right |
| AINBL | Audio left from cinch connector |
| AINBR | Audio right from cinch connector |
| AINFL | Audio left from Front connector |
| AINFR | Audio right from front connector |
| AMCO | Audio mono to the modulator |
| AMLP | Audio mono playback |
| AMLR | Audio mono record |
| AN1/2 | Analog voltage from keyboard matrix |
| ANIL | NICAM Audio, left |
| ANIR | NICAM Audio, right |
| AOUT1L | Audio output from scart 1, left |
| AOUT1R | Audio output from scart 1, right |
| AOUT2L | Audio output from scart 2, left |
| AOUT2R | Audio output from scart 2, right |
| APH | Audio playback head |
| ARH | Audio record head |
| CAGC | Chroma Automatic gain control |
| CAP | Capstan regulation voltage |
| CKDET | Colour killer detection |
| CNR | Chroma Noise Reduction |
| CPRV | Chrominance PAL record |
| CREV | Capstan reverse |
| CROT | Colour rotation |
| CS0 | Chip Select 0 |
| CS1 | Chip Select 1 |
| CSCP | Colour phase switching for LP feature mode |
| CSI | Colour system information |
| CSP | Chrominance secam playback |
| CSPO | Chroma to Noise Reduction |
| CSRV | Chrominance secam record |
| CSW | 9V/17V switching for capstan motor |
| CSYNC/1/2 | Composite sync pulse |
| CTL1/2 | Control track signal |
| D0-7 | Data lines |
| DC_RESET | Reset Display Control |
| DRUM | Head wheel control |
| EDIT1/2 | Synchro-Edit control signal |
| ENVC | Envelope comparator signal |
| FFP | Feature frame pulse |
| FGD | Capstan tacho pulse digital |
| FM1 | L+R |
| FM2 | 2R |
| FMAP | FM audio playback |
| FMAR | FM audio record |
| FMPV | FM video playback |
| FMRV | FM video record |
| FOME | Follow Me (video signals equal) |
| FSC | Colour subcarrier |
| FTA | Threading tacho |
| FTAD | Threading tacho digital |
| HEHI | Heater for displaytube high |
| HELO | Heater for displaytube low |
| HEST | Heater voltage control signal |
| HP1 | Head pulse video |
| HP2 | Head pulse audio |
| HSC | Head Select Control (SP/LP) |
| IMEO | Main erase oscillator on/off |
| INIT | Deck switch |
| INT | Interrupt |
| IPOR | Inverse power on reset |
| IRAF | Inverse record FM-audio |
| IRAL | Inverse Record Audio Linear |
| IREV | Inverse Record Video |
| ISTBY | Inverse stand by |
| ISWS | Crosstalk Reduction |
| IWIND | Control pulse amplification low |
| LH1/2/C | Long play heads |
| MEH1/2 | Main erase head |
| MON | Loop through pin 16 scart 2/1 |
| MTA | Audio mute |
| NC | Not connected |
| ODAT | Shift register bus data |
| OFP | OSD Frame pulse |
| PBV | Playback Video |
| PG_FG | Head wheel position/-speed |
| PIN10_IN | Pin 10 scart 1/2 output |
| PIN10_OUT | Pin 10 scart 1/2 input |
| POR | Power on reset |
| PSS | PAL/SECAM Switch |
| RD | Output Enable RAM/ROM |
| RECP | Record protection |
| RxD | Receive Data |
| SB1 | Secam band 1 |
| SCL | IIC bus clock |
| SDA | IIC bus data |
| SCL2 | YCA IIC bus clock |
| SDA2 | YCA IIC bus data |
| SCL3 | High Speed IIC bus clock |
| SDA3 | High Speed IIC bus data |
| SFS | Sound filter switch |
| SH1/2/C | Standard play heads |
| SRCLK | Shift Register Clock |
| SSIF | Second sound intermediate frequency |
| STROBE | Strobe pulse for shiftregister |
| SWIN | Head switching pulse |
| SYNC | Control track pulse |
| TAE | Tape end detection |
| TAS | Tape start detection |
| THIO | Threading motor in/out |
| TMO | Loading motor on/off |
| TRIA_ALM | Tracking information audio / Audio level indication |
| TRIV | Tracking information video |
| TxD | Transmit Data |
| VBS | Video to signal electronics |
| VCCD1 | Signal before Y-CCD |
| VCCD2 | Signal after Y-CCD |
| VFRONT | Video from front connector |
| VFV | Video from front end |
| VIDOUT1 | Video output scart 1 |
| VIDOUT2 | Video output scart 2 |
| VIDEOIN1 | Video input scart 1 |
| VIDEOIN2 | Video input scart 2 |
| VISS | Control sync pulse inversion |
| VOL | headphone volume |
| VOUT | Video from OSD part |
| VSB | Video from signal electronics |
| W_R | Control track write/read |
| WR | Write enable for RAM |
| WTL | Wind tacho left |
| WTLD | Wind tacho left digital |
| WTR | Wind tacho right |
| WTRD | Wind tacho right digital |

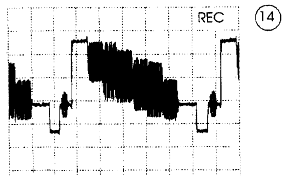
## Wiring Diagram



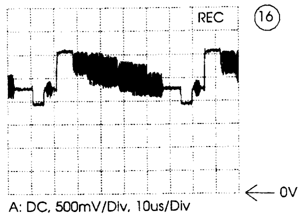
TUNER+MODULATOR
NICAM + STEREO
SCART 1/2
1951
1952
CINCH
1954
1955
LO
GNDAIO
RO
GNDAIO
LI
GNDAIO
RI
1953
VideoOut
GNDVSIO
GNDVSIO
VIDEOIN
1957
SAT-CONTR
1941
8004... # 2690.
8002... # 2688.
1948
GNDD
POS
M0
M2
M3
M1
1964
MEH1
MEH2
1947
TMO2
N.C.
TMO1
8003... # 2692.
1911
SH1
SHC
SH2
LH2
LHC
LH1
AH2
AHC
AH1
1912
Rotating Trafo-Conn.
1960
ARH
GND
APH
AEH2
AEH1
CTL2
CTL1
TD4
M1
M3
M2
M0
POS
GNDD
8001... # 2625.
TD3(L4)
THREADING MOTOR
CAPSTAN-MOTOR-CONN.
1946
GNDD
9_14VM2
CAP
+5D
GNDM2
CREV
GNDD
FG
TD1(L3)
AUDIO-CONTROL-HEAD
TD2(L8)
MEH2
MEH1
ERASE-HEAD
1961
MIC
GNDAIO
HEADPH_R
GNDAIO
HEADPH_L
1956
VFRONT
12VASW
GNDVSIO
VOL
AINFL
GNDAIO
AINFR
AMB
Motherboard
Component side
MOBO-DECK
ASM
Power Supply
Component side
1945
INT
5VD
12VA
GNDD
N.C.
RXD
SCL
TXD
IPOR
FREE
SDA
1942
GNDM1
GNDDC
GNDM2
33V
14VDC
14VM1
9_14VM2
9_14VM2
28VNEG
GNDD
CSW
12VA
SENSE
5V
5V
GNDA
GNDA
8018... # 2698.
1915
1944
SDA
5VD
SCL
14VDC
HEHI
28NEG
HELO
ISTBY
GNDDC
GNDD
RESET
IPOR
HEST
INT
1991
EDIT2
GNDD
EDIT1
8012... # 2692.
8011... # 2691.
8013... # 2693.
1958
8021... # 2700.
8022... # 2689.
8020... # 2699.
8017... # 2697.
1924
to ADCG6.1
SOCKET-Pr.:
ACP3
ACG6.1
ACL8.1
1982
VIDEO
+12V
GNDV
VOL
AUDIO_L
GNDA
AUDIO_R
1987
MIC
GNDMIC
HEADPH_R
GNDHP
HEADPH_L
1980
EDIT2
GNDE
EDIT1
HEADPHONE
MICROPHONE
AUDIO
R in
L in
VIDEO
VID in
SYNC-
EDIT
1929
GNDD
AN2
ESD_GND
AN3
8014... # 2695.
1922
ADC
Display Control
Component side
ADCP3
ADCG6.1
ADCL8.1
1926
1920
1923
1921
AN1
GNDD
AN2
8015... # 2694.
KEY-Pr.:
AKP31
1925
AN1
GNDD
AN2
8016... # 2696.
1927
to ADCG6.1

PCS93913

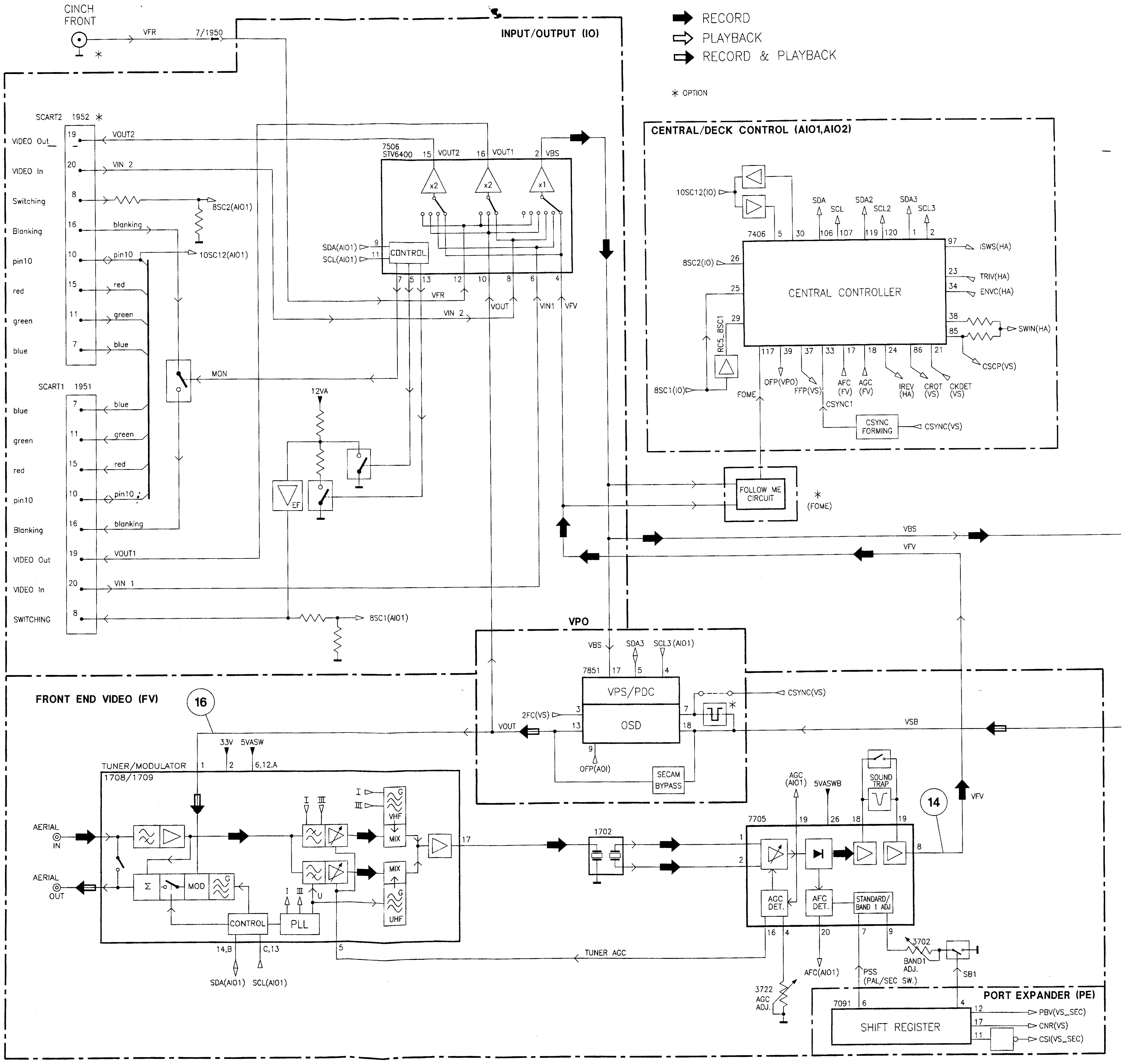
# Block Diagram Video



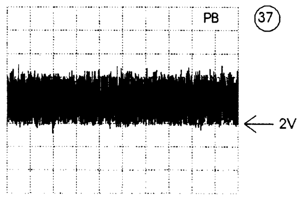
A: DC, 500mV/Div, 10us/Div
IC 7705 Pin 8



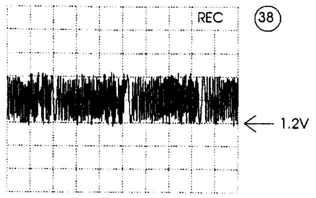
A: DC, 500mV/Div, 10us/Div
Tumod Pin 1


RECORD
PLAYBACK
RECORD & PLAYBACK
* OPTION
CINCH FRONT
VFR
7/1950
INPUT/OUTPUT (IO)
SCART2 1952 *
VIDEO Out
VIDEO In
Switching
Blanking
pin10
red
green
blue
VOUT2
VIN 2
8SC2(AIO1)
blanking
10SC12(AIO1)
7506 STV6400
VOUT2
VOUT1
VBS
x2
x2
x1
SDA(AIO1)
SCL(AIO1)
CONTROL
VFR
VIN 2
VOUT
VIN1
VFV
MON
SCART1 1951
blue
green
red
pin10
Blanking
VIDEO Out
VIDEO In
SWITCHING
VOUT1
VIN 1
12VA
EF
8SC1(AIO1)
CENTRAL/DECK CONTROL (AIO1,AIO2)
10SC12(IO)
SDA
SCL
SDA2
SCL2
SDA3
SCL3
7406
8SC2(IO)
CENTRAL CONTROLLER
ISWS(HA)
TRIV(HA)
ENVC(HA)
SWIN(HA)
CSCP(VS)
RC5_8SC1
8SC1(IO)
FOME
OFP(VPO)
FFP(VS)
AFC (FV)
AGC (FV)
IREV (HA)
CROT (VS)
CKDET (VS)
CSYNC1
CSYNC FORMING
CSYNC(VS)
FOLLOW ME CIRCUIT
* (FOME)
VBS
VFV
VPO
VBS
SDA3
SCL3 (AIO1)
7851
VPS/PDC
OSD
2FC(VS)
VOUT
OFP(AOI)
SECAM BYPASS
CSYNC(VS)
VSB
FRONT END VIDEO (FV)
16
33V
5VASW
TUNER/MODULATOR 1708/1709
6,12,A
AERIAL IN
AERIAL OUT
Σ
MOD
G
CONTROL
PLL
I
III
U
VHF
MIX
UHF
14,B
C,13
SDA(AIO1)
SCL(AIO1)
TUNER AGC
1702
7705
AGC (AIO1)
5VASWB
SOUND TRAP
14
VFV
AGC DET.
AFC DET.
STANDARD/ BAND 1 ADJ
3702
BAND1 ADJ.
SB1
AFC(AIO1)
PSS (PAL/SEC SW.)
3722
AGC ADJ.
PORT EXPANDER (PE)
7091
SHIFT REGISTER
PBV(VS_SEC)
CNR(VS)
CSI(VS_SEC)

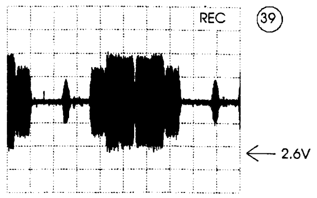
# Block Diagram Video



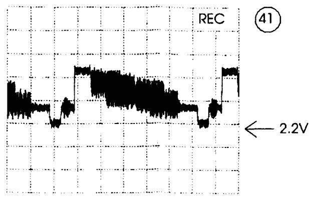
A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



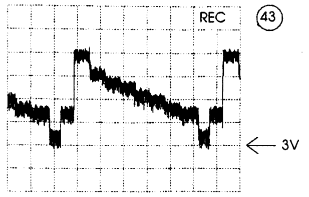
A: AC, 200mV/Div, 20us/Div
FMRV



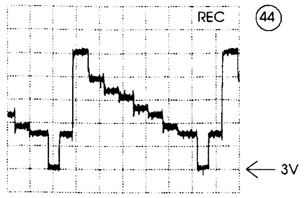
A: AC, 100mV/Div, 10us/Div
CPRV



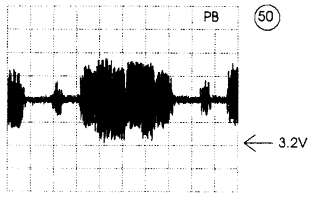
A: AC, 500mV/Div, 10us/Div
IC 7005 Pin 35



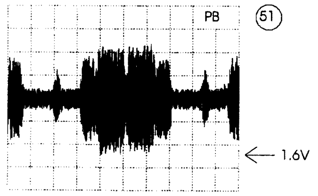
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 40



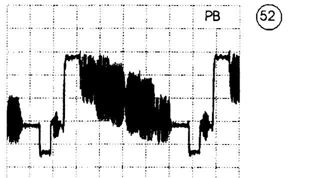
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 26



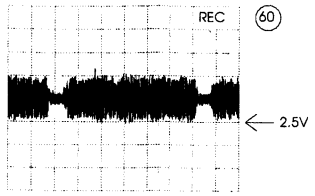
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 52



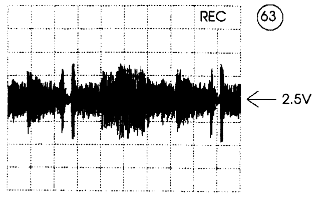
A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 45



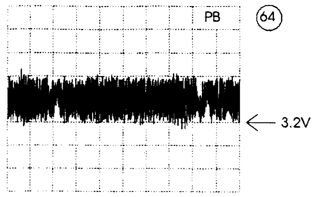
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35



A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 29



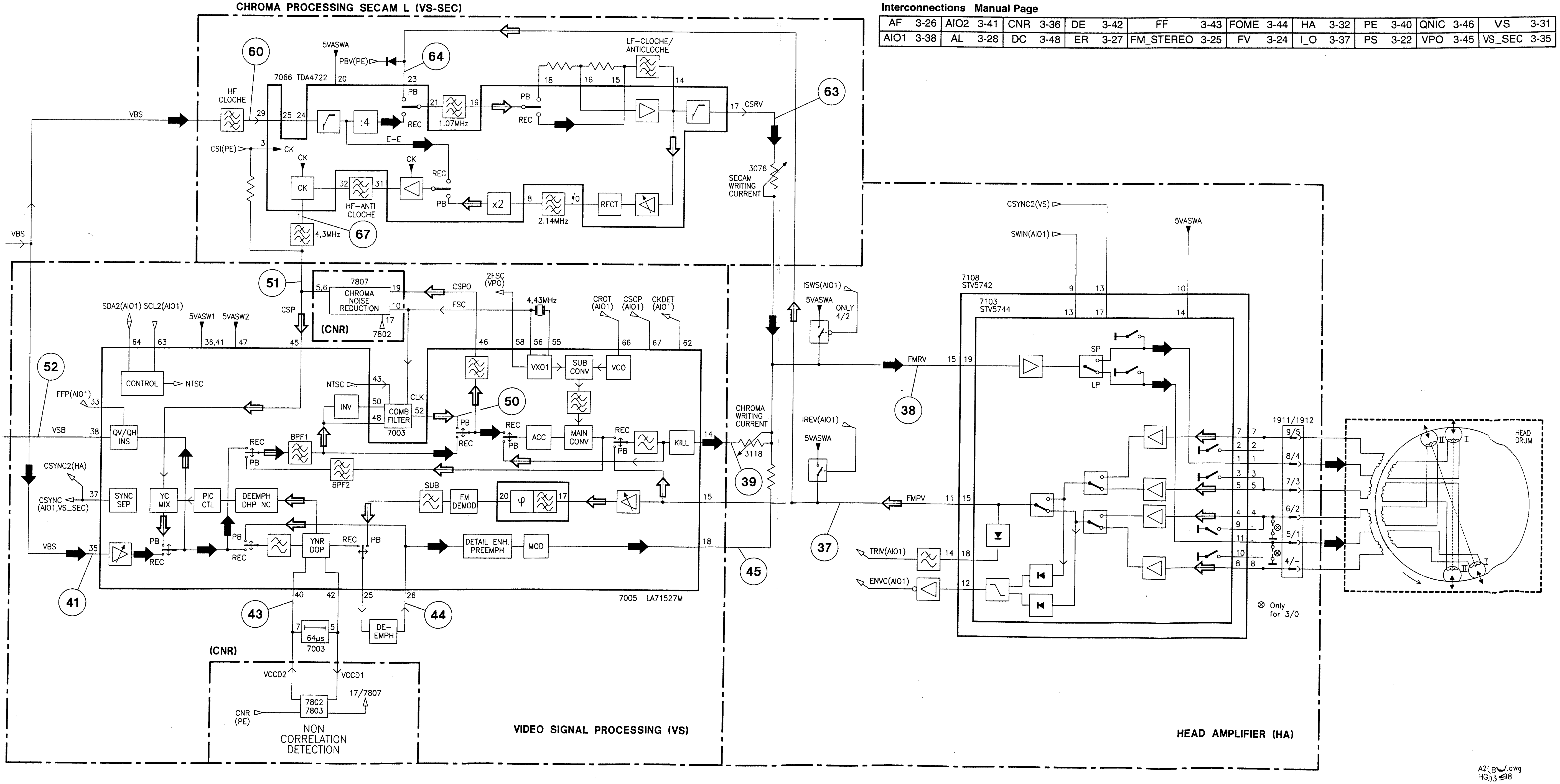
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 17



A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 23

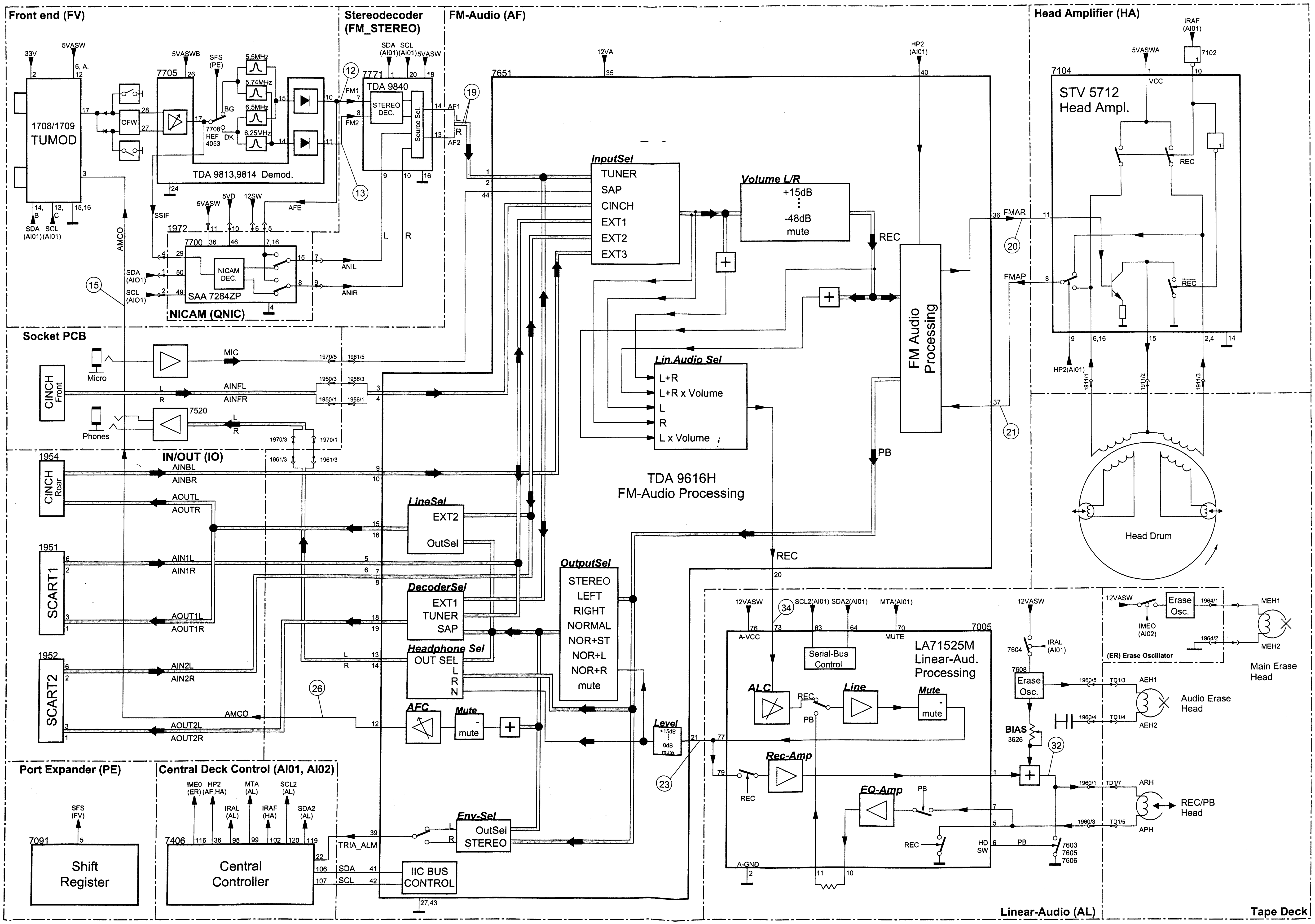
**Interconnections Manual Page**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |

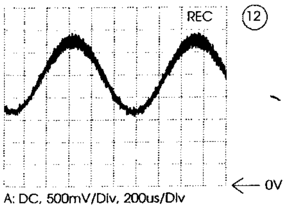

CHROMA PROCESSING SECAM L (VS-SEC)
60
5VASWA
PBV(PE)
64
7066 TDA4722
20
23
HF CLOCHE
29
25 24
:4
PB
REC
21
19
1.07MHz
LF-CLOCHE/ ANTICLOCHE
18
16
15
14
17 CSRV
63
E-E
CSI(PE)
3
CK
CK
32
31
HF-ANTI CLOCHE
x2
8
2.14MHz
10
RECT
1
4,3MHz
67
3076
SECAM WRITING CURRENT
VBS
VBS
51
7807
5,6
CHROMA NOISE REDUCTION
19
10
17
7802
(CNR)
CSP
CSPO
FSC
2FSC (VPO)
4,43MHz
CROT (AIO1)
CSCP (AIO1)
CKDET (AIO1)
SDA2(AIO1) SCL2(AIO1)
5VASW1 5VASW2
64
63
36,41
47
45
46
58
56
55
66
67
62
52
CONTROL
NTSC
FFP(AIO1)
33
NTSC
43
INV
50
48
COMB FILTER
7003
CLK
52
50
VXO1
SUB CONV
VCO
ACC
MAIN CONV
KILL
14
VSB
38
QV/QH INS
BPF1
BPF2
REC
PB
CSYNC2(HA)
CSYNC (AIO1,VS_SEC)
37
SYNC SEP
YC MIX
PIC CTL
DEEMPH DHP NC
SUB
FM DEMOD
20
φ
17
15
VBS
35
YNR DOP
DETAIL ENH. PREEMPH
MOD
18
41
40
42
25
26
43
44
7
5
64µs
7003
DE-EMPH
7005 LA71527M
(CNR)
VCCD2
VCCD1
17/7807
7802 7803
CNR (PE)
NON CORRELATION DETECTION
VIDEO SIGNAL PROCESSING (VS)
CHROMA WRITING CURRENT
3118
39
45
37
ISWS(AIO1)
5VASWA
ONLY 4/2
IREV(AIO1)
5VASWA
FMRV
38
FMPV
CSYNC2(VS)
SWIN(AIO1)
5VASWA
7108 STV5742
7103 STV5744
9
13
10
13
17
14
15
19
11
15
SP
LP
TRIV(AIO1)
14
18
ENVC(AIO1)
12
7 7
2 2
1 1
3 3
5 5
4 4
9
11
10
8 8
1911/1912
9/5
8/4
7/3
6/2
5/1
4/-
⊗ Only for 3/0
HEAD DRUM
I
II
HEAD AMPLIFIER (HA)

A20B[illegible].dwg
HG03[illegible]8
[illegible]S 93915

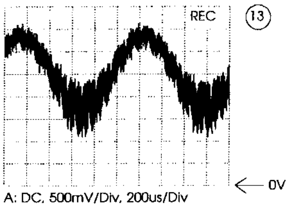
## Block Diagram Audio


Front end (FV)
33V
5VASW
1708/1709
TUMOD
SDA (AI01)
SCL (AI01)
OFW
5VASWB
7705
SFS (PE)
5,5MHz
5,74MHz
6,5MHz
6,25MHz
BG
DK
7708 HEF 4053
TDA 9813,9814 Demod.
SSIF
5VASW
5VD
12SW
AFE
1972
7700
NICAM DEC.
SAA 7284ZP
NICAM (QNIC)
ANIL
ANIR
AMCO
Stereodecoder (FM_STEREO)
SDA (AI01)
SCL (AI01)
5VASW
7771
TDA 9840
STEREO DEC.
Source Sel.
FM1
FM2
AF1
AF2
L
R
FM-Audio (AF)
12VA
HP2 (AI01)
7651
InputSel
TUNER
SAP
CINCH
EXT1
EXT2
EXT3
Volume L/R
+15dB
-48dB
mute
REC
PB
FM Audio Processing
FMAR
FMAP
Lin.Audio Sel
L+R
L+R x Volume
L
R
L x Volume
TDA 9616H FM-Audio Processing
LineSel
EXT2
OutSel
DecoderSel
EXT1
TUNER
SAP
Headphone Sel
OUT SEL
L
R
N
OutputSel
STEREO
LEFT
RIGHT
NORMAL
NOR+ST
NOR+L
NOR+R
mute
AFC
Mute
mute
Level
+15dB
0dB
mute
Env-Sel
OutSel
STEREO
IIC BUS CONTROL
TRIA_ALM
SDA
SCL
Head Amplifier (HA)
IRAF (AI01)
5VASWA
7102
7104
STV 5712 Head Ampl.
VCC
REC
HP2(AI01)
Head Drum
Socket PCB
Micro
MIC
CINCH Front
AINFL
AINFR
Phones
7520
IN/OUT (IO)
1954
CINCH Rear
AINBL
AINBR
AOUTL
AOUTR
1951
SCART1
AIN1L
AIN1R
AOUT1L
AOUT1R
1952
SCART2
AIN2L
AIN2R
AMCO
AOUT2L
AOUT2R
Port Expander (PE)
SFS (FV)
7091
Shift Register
Central Deck Control (AI01, AI02)
IMEO (ER)
HP2 (AF,HA)
IRAL (AL)
MTA (AL)
IRAF (HA)
SCL2 (AL)
SDA2 (AL)
7406
Central Controller
12VASW
SCL2(AI01)
SDA2(AI01)
MTA(AI01)
A-VCC
MUTE
7005
Serial-Bus Control
LA71525M Linear-Aud. Processing
ALC
Line
Mute
mute
REC
PB
Rec-Amp
EQ-Amp
A-GND
HD SW
12VASW
7604
IRAL (AI01)
7608
Erase Osc.
BIAS
3626
7603
7605
7606
Linear-Audio (AL)
12VASW
Erase Osc.
IMEO (AI02)
(ER) Erase Oscillator
MEH1
MEH2
Main Erase Head
AEH1
AEH2
Audio Erase Head
ARH
APH
REC/PB Head
Tape Deck
⑫
⑬
⑮
⑲
⑳
㉑
㉓
㉖
㉜
㉞

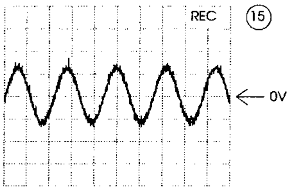
# Oscillograms Block Diagram Audio



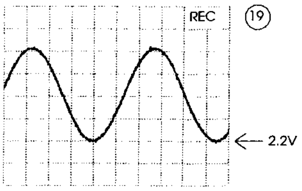
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 10



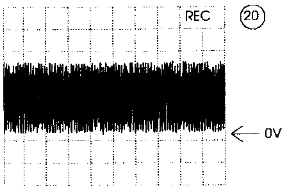
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 11



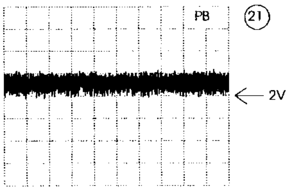
A: DC, 500mV/Div, 500us/Div
Tumod Pin 3



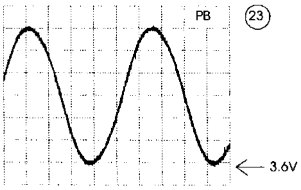
A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 13/14



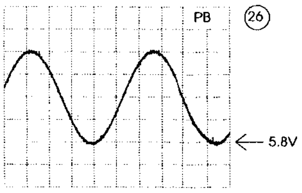
A: DC, 200mV/Div, 5ms/Div
FMAR



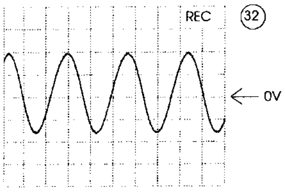
A: AC, 200mV/Div, 500us/Div
FMAP



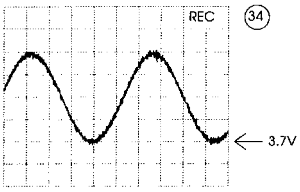
A: AC, 100mV/Div, 200us/Div
IC 7651 Pin 21



A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 18/19



A: DC, 20 V/Div, 5us/Div
Connector 1960 Pin 1

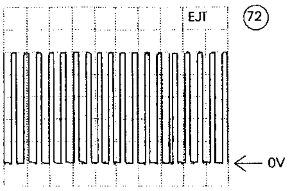


A: AC, 50mV/Div, 200us/Div
IC 7005 Pin 73

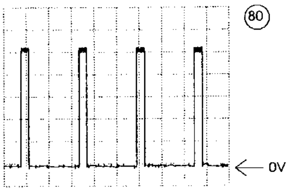
**Interconnections Manual Page**

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF | 3-26 | AIO2 | 3-41 | CNR | 3-36 | DE | 3-42 | FF | 3-43 | FOME | 3-44 | HA | 3-32 | PE | 3-40 | QNIC | 3-46 | VS | 3-31 |
| AIO1 | 3-38 | AL | 3-28 | DC | 3-48 | ER | 3-27 | FM_STEREO | 3-25 | FV | 3-24 | I_O | 3-37 | PS | 3-22 | VPO | 3-45 | VS_SEC | 3-35 |

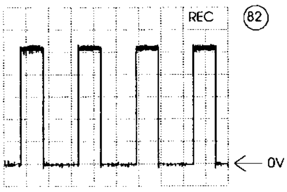
# Oscillograms Block Diagram Digital



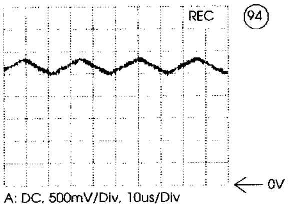
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



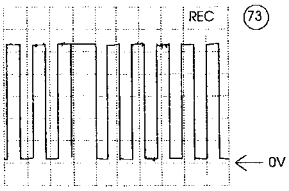
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 89



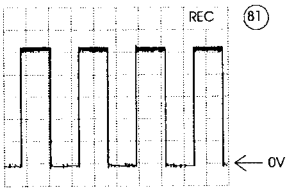
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 87



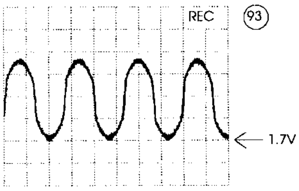
A: DC, 500mV/Div, 10us/Div
Connector 1946 Pin 6



A: DC, 1 V/Div, 2ms/Div
IC 7406 Pin 28



A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 88

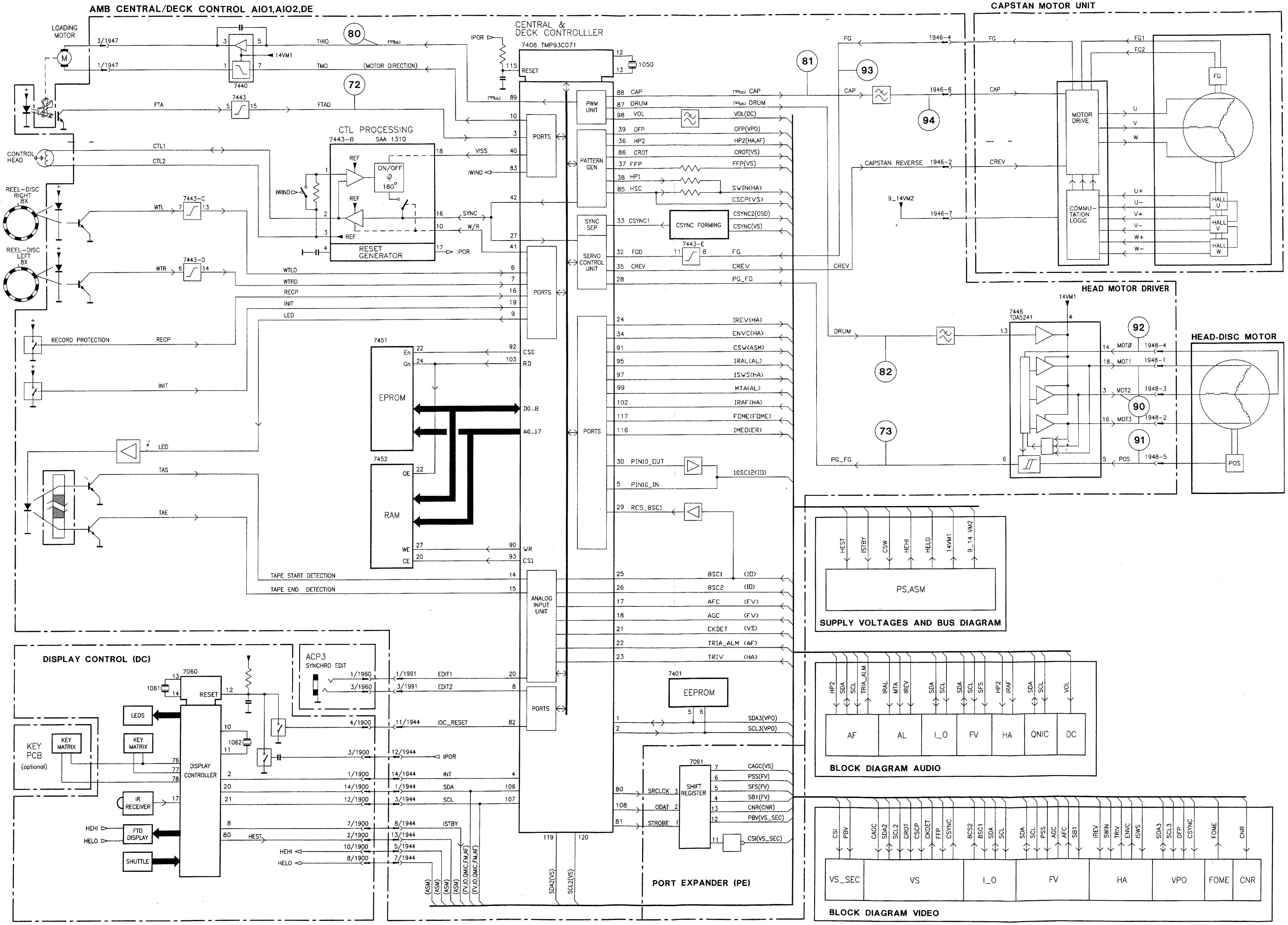


A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4

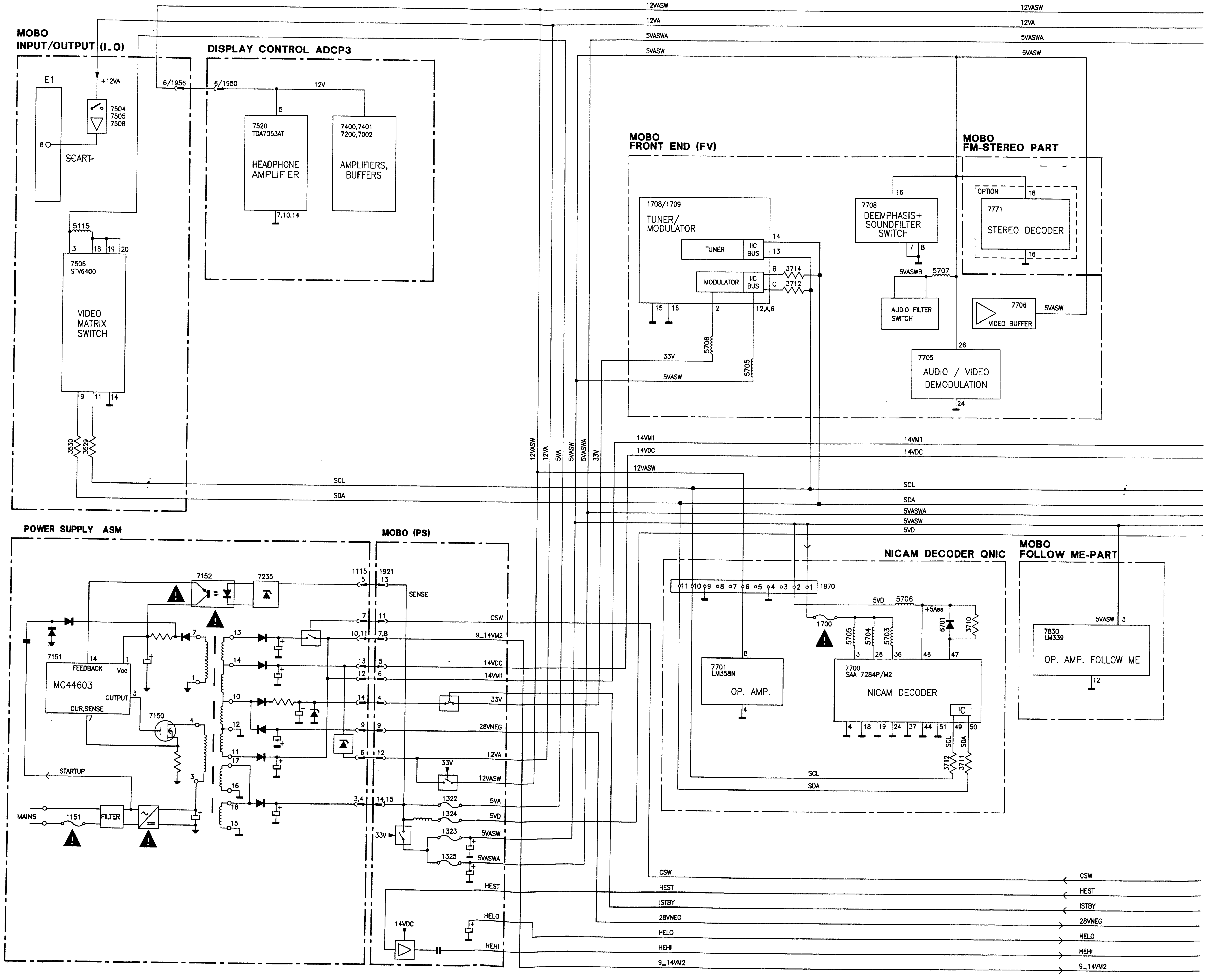
**Interconnections** **Manual Page**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |

# Block Diagram Digital

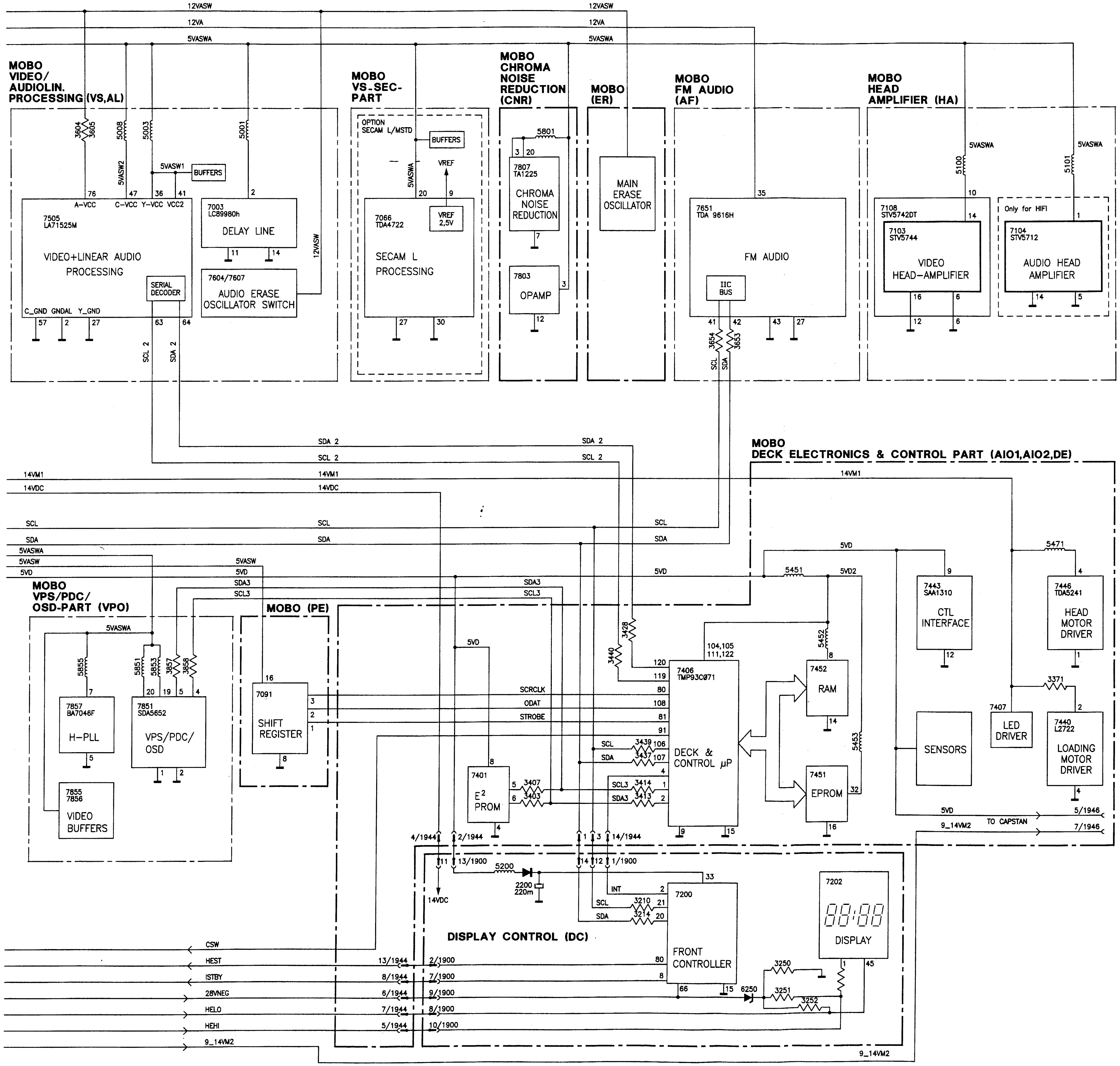

AMB CENTRAL/DECK CONTROL AIO1,AIO2,DE
LOADING MOTOR
M
3/1947
1/1947
7440
14VM1
THIO
TMO
(MOTOR DIRECTION)
80
72
7443
FTA
FTAD
CONTROL HEAD
CTL1
CTL2
CTL PROCESSING
7443-B SAA 1310
REF
ON/OFF
φ
180°
IWIND
VISS
SYNC
W/R
RESET GENERATOR
IPOR
REEL-DISC RIGHT 8X
WTL
7443-C
REEL-DISC LEFT 8X
WTR
7443-D
WTLD
WTRD
RECP
INIT
LED
RECORD PROTECTION
TAS
TAE
TAPE START DETECTION
TAPE END DETECTION
CENTRAL & DECK CONTROLLLER
7406 TMP93C071
RESET
1050
PORTS
PWM UNIT
PATTERN GEN
SYNC SEP
SERVO CONTROL UNIT
ANALOG INPUT UNIT
7451
EPROM
En
Gn
CS0
RD
D0...8
A0...17
7452
RAM
OE
WE
CE
WR
CS1
88 CAP
87 DRUM
98 VOL
39 OFP
36 HP2
86 CROT
37 FFP
38 HP1
85 HSC
33 CSYNC1
CSYNC FORMING
7443-E
32 FGD
35 CREV
28
CAP
DRUM
VOL(DC)
OFP(VPO)
HP2(HA,AF)
CROT(VS)
FFP(VS)
SWIN(HA)
CSCP(VS)
CSYNC2(OSD)
CSYNC(VS)
FG
CREV
PG_FG
IREV(HA)
ENVC(HA)
CSW(ASM)
IRAL(AL)
ISWS(HA)
MTA(AL)
IRAF(HA)
FOME(FOME)
IMEO(ER)
30 PIN10_OUT
5 PIN10_IN
10SC12(IO)
29 RC5_8SC1
8SC1 (IO)
8SC2 (IO)
AFC (FV)
AGC (FV)
CKDET (VS)
TRIA_ALM (AF)
TRIV (HA)
7401
EEPROM
SDA3(VPO)
SCL3(VPO)
7091
SHIFT REGISTER
SRCLCK
ODAT
STROBE
CAGC(VS)
PSS(FV)
SFS(FV)
SB1(FV)
CNR(CNR)
PBV(VS_SEC)
CSI(VS_SEC)
PORT EXPANDER (PE)
SDA2(VS)
SCL2(VS)
81
93
94
CAPSTAN MOTOR UNIT
1946-4
1946-6
1946-2
1946-7
CAPSTAN REVERSE
9_14VM2
FG1
FG2
MOTOR DRIVE
COMMU-TATION LOGIC
U
V
W
U+
U-
V+
V-
W+
W-
HALL U
HALL V
HALL W
HEAD MOTOR DRIVER
14VM1
7446 TDA5241
92
82
90
91
73
MOTØ
MOT1
MOT2
MOT3
POS
1948-4
1948-1
1948-3
1948-2
1948-5
HEAD-DISC MOTOR
DISPLAY CONTROL (DC)
7060
1061
1062
DISPLAY CONTROLLER
LEDS
KEY MATRIX
KEY PCB (optional)
IR RECEIVER
FTD DISPLAY
SHUTTLE
HEHI
HELO
ACP3 SYNCHRO EDIT
1/1960
3/1960
1/1991
3/1991
EDIT1
EDIT2
4/1900
11/1944
IDC_RESET
3/1900
12/1944
1/1900
14/1944
INT
14/1900
1/1944
SDA
12/1900
3/1944
SCL
7/1900
8/1944
ISTBY
2/1900
13/1944
HEST
10/1900
5/1944
8/1900
7/1944
(ASM)
(FV,IO,QNIC,FM,AF)
HEST
ISTBY
CSW
HEHI
HELO
14VM1
9_14 VM2
PS,ASM
SUPPLY VOLTAGES AND BUS DIAGRAM
HP2
SDA
SCL
TRIA_ALM
IRAL
MTA
IREV
SFS
IRAF
VOL
AF
AL
I_O
FV
HA
QNIC
DC
BLOCK DIAGRAM AUDIO
CSI
PBV
CAGC
SDA2
SCL2
CROT
CSCP
CKDET
FFP
CSYNC
8SC2
8SC1
PSS
AFC
SB1
SWIN
TRIV
ENVC
ISWS
SDA3
SCL3
OFP
FOME
CNR
VS_SEC
VS
I_O
FV
HA
VPO
FOME
CNR
BLOCK DIAGRAM VIDEO

## Block Diagram Supply & I$^2$C


MOBO INPUT/OUTPUT (I_O)
E1
+12VA
7504
7505
7508
8
SCART
5115
3 18 19 20
7506 STV6400
VIDEO MATRIX SWITCH
9 11 14
3530
3529
DISPLAY CONTROL ADCP3
6/1956
6/1950
12V
5
7520 TDA7053AT
HEADPHONE AMPLIFIER
7,10,14
7400,7401 7200,7002
AMPLIFIERS, BUFFERS
12VASW
12VA
5VASWA
5VASW
MOBO FRONT END (FV)
1708/1709
TUNER/ MODULATOR
TUNER
MODULATOR
IIC BUS
14
13
B 3714
C 3712
15 16
2
12,A,6
5706
5705
33V
5VASW
MOBO FM-STEREO PART
7708
DEEMPHASIS+ SOUNDFILTER SWITCH
16
7 8
5VASWB 5707
AUDIO FILTER SWITCH
OPTION
7771
STEREO DECODER
18
16
7706
VIDEO BUFFER
5VASW
7705
AUDIO / VIDEO DEMODULATION
26
24
12VASW
12VA
5VA
5VASW
5VASWA
33V
14VM1
14VDC
12VASW
SCL
SDA
5VASWA
5VASW
5VD
POWER SUPPLY ASM
MOBO (PS)
7152
7235
1115
1921
5
13
SENSE
7151
MC44603
FEEDBACK
Vcc
OUTPUT
CUR.SENSE
14
1
3
7
7150
4
STARTUP
MAINS
1151
FILTER
13
14
10
12
11
17
16
18
15
7
1
3
CSW
9_14VM2
14VDC
14VM1
33V
28VNEG
12VA
12VASW
5VA
5VD
5VASW
5VASWA
HEST
HELO
HEHI
7 11
10,11 7,8
13 5
12 6
14 4
9 9
6 12
3,4 14,15
1322
1324
1323
1325
33V
14VDC
NICAM DECODER QNIC
1970
11 10 9 8 7 6 5 4 3 2 1
5VD 5706
+5Ass
1700
5705
5704
5703
6701
3710
3 26 36 46 47
8
7701 LM358N
OP. AMP.
4
7700 SAA 7284P/M2
NICAM DECODER
IIC
4 18 19 24 37 44 51 49 50
SCL
SDA
3712
3711
SCL
SDA
MOBO FOLLOW ME-PART
5VASW 3
7830 LM339
OP. AMP. FOLLOW ME
12
CSW
HEST
ISTBY
28VNEG
HELO
HEHI
9_14VM2

MOBO ... MOTHERBOARD

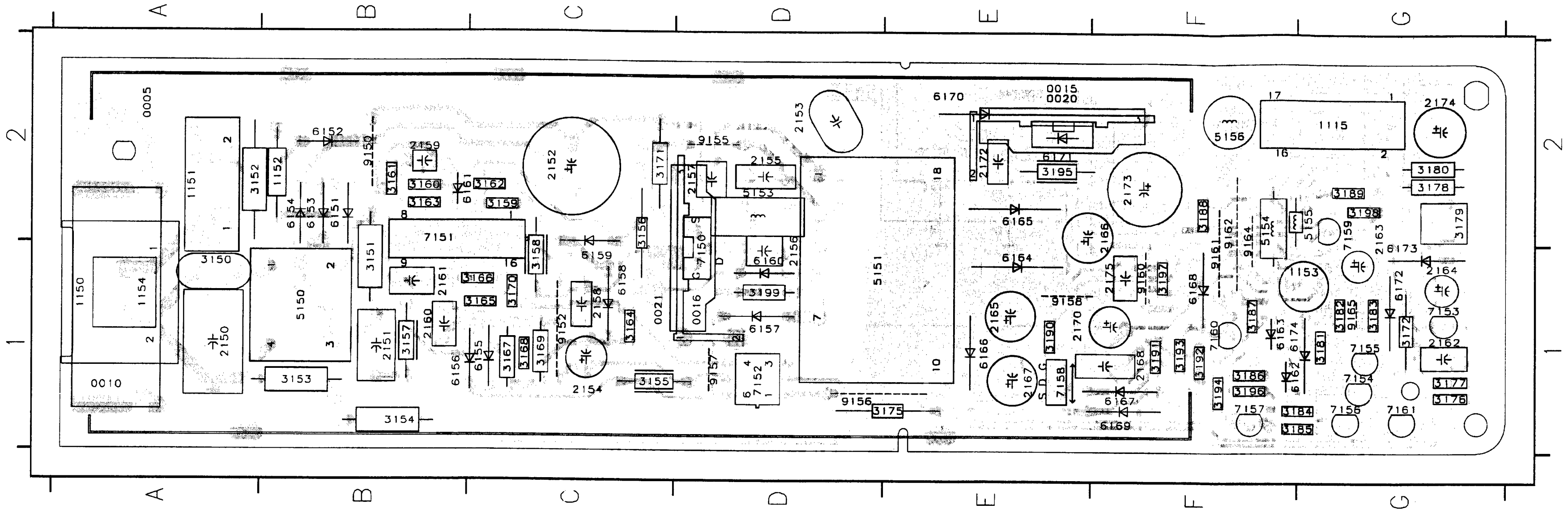
## Block Diagram Supply & $I^2C$

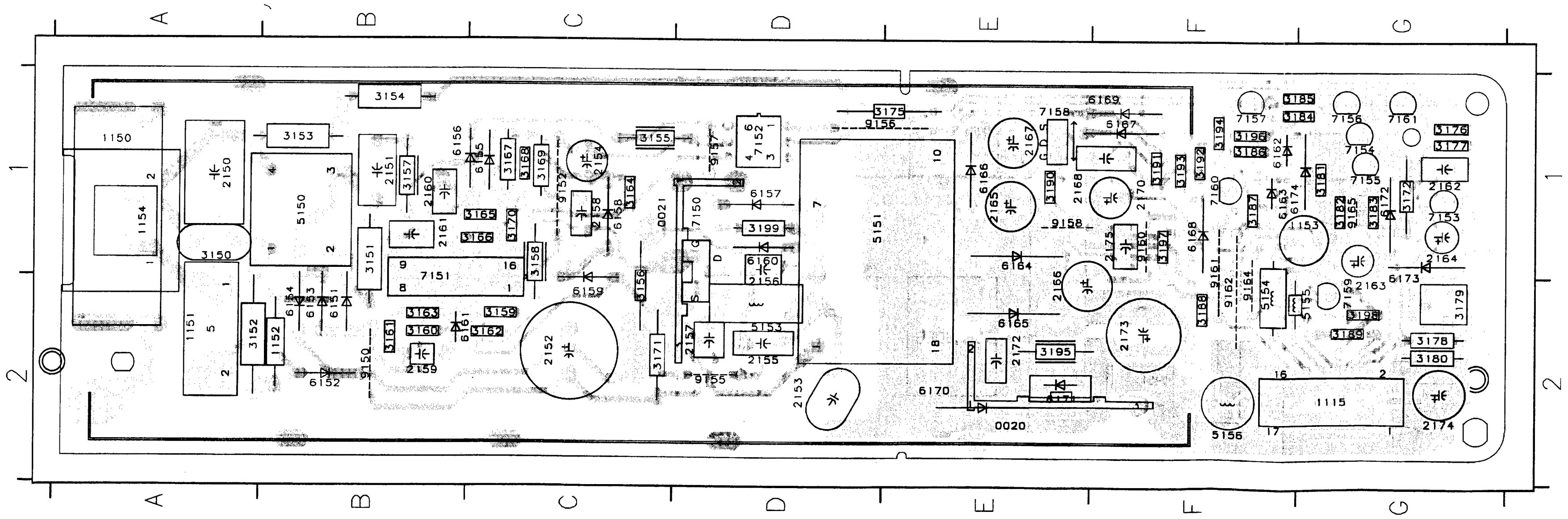

12VASW
12VA
5VASWA
MOBO VIDEO/ AUDIOLIN. PROCESSING (VS,AL)
3604
3605
5008
5003
5001
5VASW2
5VASW1
BUFFERS
76
47
36
41
2
A-VCC C-VCC Y-VCC VCC2
7505 LA71525M
VIDEO+LINEAR AUDIO PROCESSING
SERIAL DECODER
C_GND GNDAL Y_GND
57
2
27
63
64
7003 LC89980h
DELAY LINE
11
14
7604/7607
AUDIO ERASE OSCILLATOR SWITCH
12VASW
SCL 2
SDA 2
MOBO VS-SEC-PART
OPTION SECAM L/MSTD
BUFFERS
5VASWA
VREF
20
9
7066 TDA4722
VREF 2,5V
SECAM L PROCESSING
27
30
MOBO CHROMA NOISE REDUCTION (CNR)
5801
3
20
7807 TA1225
CHROMA NOISE REDUCTION
7
7803
OPAMP
3
12
MOBO (ER)
MAIN ERASE OSCILLATOR
MOBO FM AUDIO (AF)
35
7651 TDA 9616H
FM AUDIO
IIC BUS
41
42
43
27
3654
3653
SCL
SDA
MOBO HEAD AMPLIFIER (HA)
5VASWA
5100
10
7108 STV5742DT
14
7103 STV5744
VIDEO HEAD-AMPLIFIER
16
6
12
6
5VASWA
5101
Only for HIFI
1
7104 STV5712
AUDIO HEAD AMPLIFIER
14
5
SDA 2
SCL 2
14VM1
14VDC
SCL
SDA
5VASWA
5VASW
5VD
MOBO DECK ELECTRONICS & CONTROL PART (AIO1,AIO2,DE)
14VM1
5VD
5471
5451
5VD2
9
4
7443 SAA1310
CTL INTERFACE
12
7446 TDA5241
HEAD MOTOR DRIVER
1
5452
8
104,105 111,122
7406 TMP93C071
120
119
80
108
81
91
106
107
4
1
2
3428
3440
SCL
SDA
3439
3437
SCL3
SDA3
3414
3413
DECK & CONTROL µP
9
15
7452
RAM
14
5453
7451
EPROM
32
16
SENSORS
7407
LED DRIVER
3371
2
7440 L2722
LOADING MOTOR DRIVER
4
5VD
9_14VM2
TO CAPSTAN
5/1946
7/1946
MOBO VPS/PDC/ OSD-PART (VPO)
5VASWA
5855
5851
5853
3857
3858
7
20
19
5
4
7857 BA7046F
H-PLL
5
7851 SDA5652
VPS/PDC/ OSD
1
2
7855 7856
VIDEO BUFFERS
MOBO (PE)
SDA3
SCL3
16
7091
SHIFT REGISTER
3
2
1
8
5VD
SCRCLK
ODAT
STROBE
8
7401
E² PROM
5
6
3407
3403
4
4/1944
2/1944
1
3
14/1944
11
13/1900
5200
2200 220m
14
12
1/1900
33
INT
2
7200
SCL
SDA
3210
3214
21
20
14VDC
DISPLAY CONTROL (DC)
FRONT CONTROLLER
80
8
66
15
6250
7202
88:88
DISPLAY
1
45
3250
3251
3252
CSW
HEST
ISTBY
28VNEG
HELO
HEHI
9_14VM2
13/1944
8/1944
6/1944
7/1944
5/1944
2/1900
7/1900
9/1900
8/1900
10/1900
9_14VM2

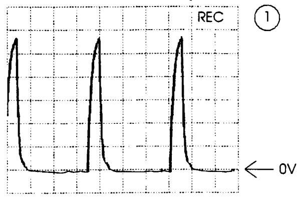
A20_BS.DWG
HG_0398

# Power Supply (ASM)

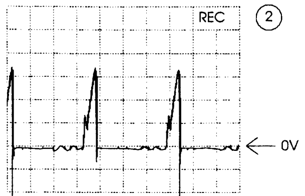
| | |
|---|---|
| 0005 | A2 |
| 0010 | A1 |
| 0015 | E2 |
| 0016 | D1 |
| 0020 | E2 |
| 0021 | C1 |
| 1115 | G2 |
| 1150 | A1 |
| 1151 | A2 |
| 1152 | B2 |
| 1153 | G1 |
| 1154 | A1 |
| 2150 | A1 |
| 2151 | B1 |
| 2152 | C2 |
| 2153 | D2 |
| 2154 | C1 |
| 2155 | D2 |
| 2156 | D1 |
| 2157 | D2 |
| 2158 | C1 |
| 2159 | B2 |
| 2160 | B1 |
| 2161 | B1 |
| 2162 | G1 |
| 2163 | G2 |
| 2164 | G1 |
| 2165 | E1 |
| 2166 | F2 |
| 2167 | E1 |
| 2168 | F1 |
| 2170 | E1 |
| 2172 | E2 |
| 2173 | F2 |
| 2174 | G2 |
| 2175 | F1 |
| 3150 | A1 |
| 3151 | B1 |
| 3152 | A2 |
| 3153 | B1 |
| 3154 | B1 |
| 3155 | C1 |
| 3156 | C2 |
| 3157 | B1 |
| 3158 | C1 |
| 3159 | C2 |
| 3160 | B2 |
| 3161 | B2 |
| 3162 | C2 |
| 3163 | B2 |
| 3164 | C1 |
| 3165 | C1 |
| 3166 | C1 |
| 3167 | C1 |
| 3168 | C1 |
| 3169 | C1 |
| 3170 | C1 |
| 3171 | C2 |
| 3172 | G1 |
| 3175 | E1 |
| 3176 | G1 |
| 3177 | G1 |
| 3178 | G2 |
| 3179 | G2 |
| 3180 | G2 |
| 3181 | G1 |
| 3182 | G1 |
| 3183 | G1 |
| 3184 | G1 |
| 3185 | G1 |
| 3186 | F1 |
| 3187 | F1 |
| 3188 | F2 |
| 3189 | G2 |
| 3190 | E1 |
| 3191 | F1 |
| 3192 | F1 |
| 3193 | F1 |
| 3194 | F1 |
| 3195 | E2 |
| 3196 | F1 |
| 3197 | F1 |
| 3198 | G2 |
| 3199 | D1 |
| 5150 | B1 |
| 5151 | D1 |
| 5153 | D2 |
| 5154 | F2 |
| 5155 | G2 |
| 5156 | F2 |
| 6151 | B2 |
| 6152 | B2 |
| 6153 | B2 |
| 6154 | B2 |
| 6155 | C1 |
| 6156 | B1 |
| 6157 | D1 |
| 6158 | C1 |
| 6159 | C1 |
| 6160 | D1 |
| 6161 | B2 |
| 6162 | F1 |
| 6163 | F1 |
| 6164 | E1 |
| 6165 | E2 |
| 6166 | E1 |
| 6167 | F1 |
| 6168 | F1 |
| 6169 | F1 |
| 6170 | E2 |
| 6171 | E2 |
| 6172 | G1 |
| 6173 | G1 |
| 6174 | F1 |
| 7150 | D1 |
| 7151 | B2 |
| 7152 | D1 |
| 7153 | G1 |
| 7154 | G1 |
| 7155 | G1 |
| 7156 | G1 |
| 7157 | F1 |
| 7158 | E1 |
| 7159 | G2 |
| 7160 | F1 |
| 7161 | G1 |
| 9150 | B2 |
| 9152 | C1 |
| 9155 | D2 |
| 9156 | D1 |
| 9157 | D1 |
| 9158 | E1 |
| 9160 | F1 |
| 9161 | F1 |
| 9162 | F2 |
| 9164 | F2 |
| 9165 | G1 |


A
B
C
D
E
F
G
2
1
0005
0010
0015
0020
1150
1151
1152
1154
1115
2150
2151
2152
2153
2154
2155
2156
2159
2160
2161
2165
2166
2167
2170
2173
2174
3150
3151
3152
3153
3154
3155
3157
3158
3160
3161
3162
3163
3165
3166
3167
3168
3169
3170
3171
3175
3178
3179
3180
3195
3199
5150
5151
5153
5155
5156
6151
6152
6154
6156
6157
6159
6164
6165
6166
6170
6171
6172
6173
7150
7151
7152
7153
7154
7155
7156
7157
7158
7159
7160
7161
9150
9155
9156
9157
9158

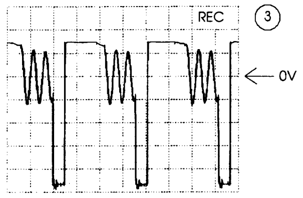

A
B
C
D
E
F
G
1
2
3154
1150
3153
1154
3150
1151
3152
6152
9150
3161
2159
3160
3163
3162
3159
7151
2151
2161
3157
2160
3165
3166
3155
2152
2153
3171
2157
2155
5153
7150
3199
6160
2156
6157
7152
3175
9156
5151
6170
0020
3195
2172
6165
6164
2165
2167
7158
6169
6167
3190
2168
2170
2175
2166
2173
9158
5156
1115
2174
3178
3180
3179
2164
6173
2163
7153
2162
7155
7154
7156
7157
7161
3176
3177
3184
3185
3186
3196



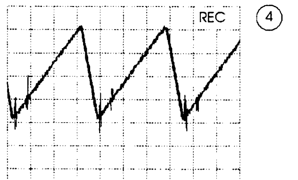
A: DC, 2 V/Div, 5us/Div
Gate 7150



A: DC, 200mV/Div, 5us/Div
Source 7150

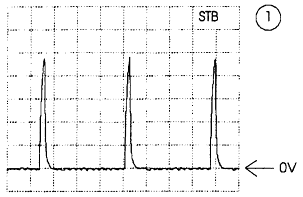


A: DC, 10 V/Div, 5us/Div
5151 Pin 7

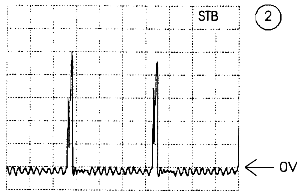


A: DC, 500mV/Div, 5us/Div
IC 7151 Pin 10

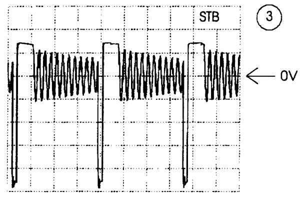
## Low Power Standby



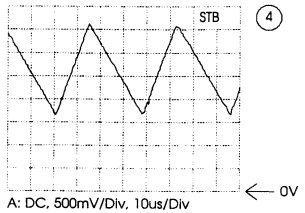
A: DC, 2 V/Div, 10us/Div
Gate 7150



A: DC, 100mV/Div, 10us/Div
Source 7150



A: DC, 10 V/Div, 10us/Div
5151 Pin 7



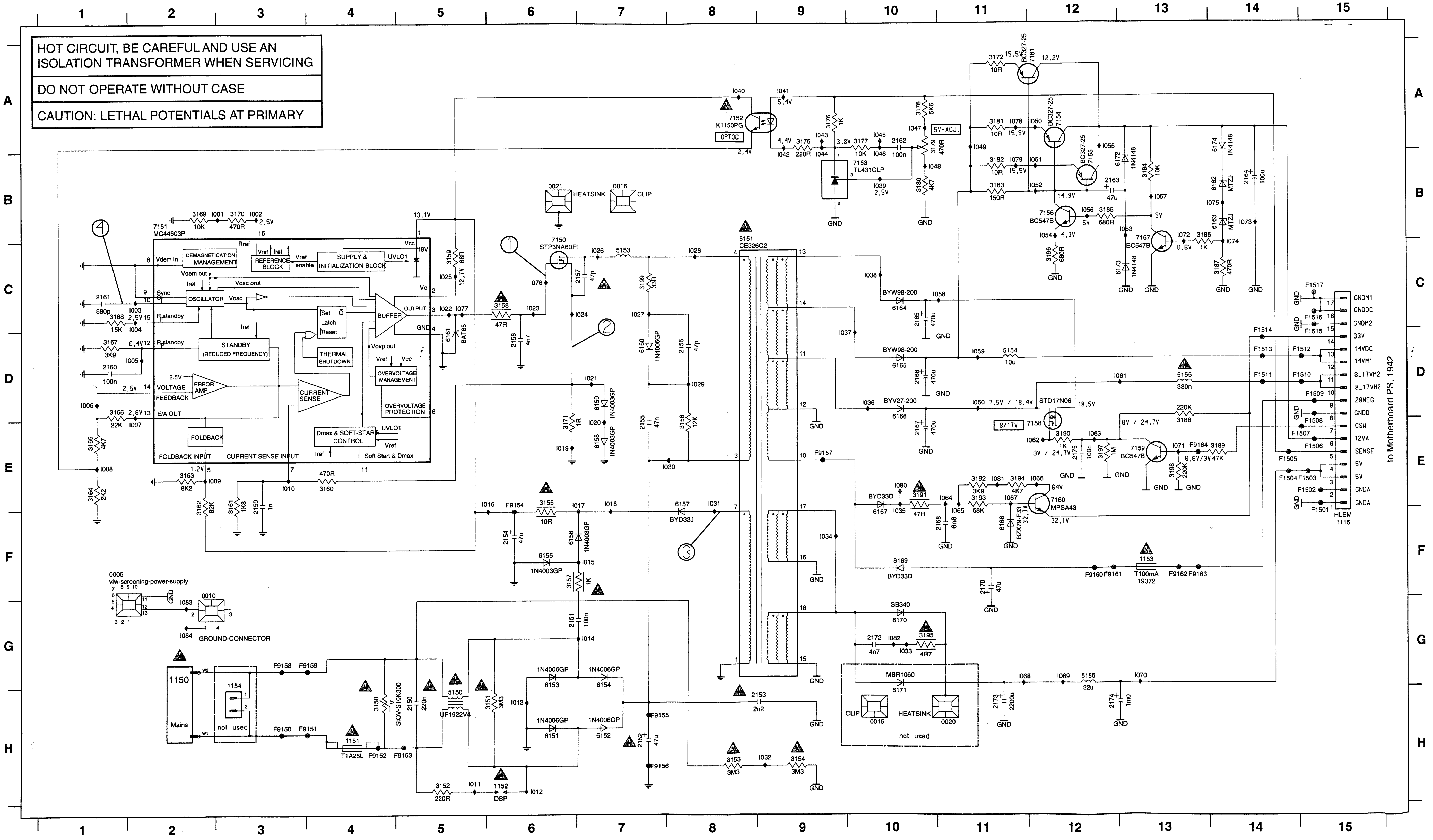
A: DC, 500mV/Div, 10us/Div
IC 7151 Pin 10

# Power Supply (ASM)

**Interconnections Manual Page**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |

0005 F1
0010 F2
0015 H10
0016 B7
0020 H11
0021 B6
1115 F15
1150 G2
1151 H4
1152 H6
1153 F13
1154 G3
2150 H5
2151 G6
2152 H7
2153 H9
2154 F6
2155 E7
2156 D8
2157 C7
2158 D6
2159 E3
2160 D1
2161 C1
2162 A10
2163 B12
2164 B14
2165 C10
2166 D10
2167 E10
2168 F11
2170 F11
2172 G10
2173 H11
2174 H12
2175 E12
3150 H4
3151 H6
3152 H5
3153 H8
3154 H9
3155 E6
3156 E8
3157 F6
3158 C6
3159 C5
3160 E4
3161 E3
3162 E2
3163 E2
3164 E1
3165 E1
3166 D1
3167 D1
3168 C1
3169 B2
3170 B3
3171 E6
3172 A11
3175 A9
3176 A9
3177 A10
3178 A10
3179 A10
3180 B10
3181 A11
3182 B11
3183 B11
3184 B13
3185 B12
3186 B13
3187 C14
3188 E13
3189 E14
3190 E12
3191 E10
3192 E11
3193 E11
3194 E11
3195 G10
3196 C12
3197 E12
3198 E13
3199 C7
5150 H5
5151 B8
5153 C7
5154 D11
5155 D13
5156 G12
6151 H6
6152 H7
6153 G6
6154 G7
6155 F6
6156 F6
6157 E8
6158 E7
6159 D7
6160 D7
6161 D5
6162 B14
6163 B14
6164 C10
6165 D10
6166 D10
6167 F10
6168 F11
6169 F10
6170 G10
6171 H10
6172 B13
6173 C13
6174 A14
7150 C6
7151 B2
7152 A8
7153 B10
7154 A12
7155 B12
7156 B12
7157 C13
7158 E12
7159 E13
7160 E12
7161 A12
F1501 F15
F1502 E15
F1503 E15
F1504 E14
F1505 E14
F1506 E15
F1507 E15
F1508 E15
F1509 D15
F1510 D15
F1511 D14
F1512 D15
F1513 D14
F1514 D14
F1515 D15
F1516 C15
F1517 C15
F9150 H3
F9151 H4
F9152 H4
F9153 H5
F9154 E6
F9155 H7
F9156 H7
F9157 E9
F9158 G3
F9159 G4
F9160 F12
F9161 F12
F9162 F13
F9163 F13
F9164 E13
I001 B3
I002 B3
I003 C2
I004 C2
I005 D2
I006 D1
I007 E2
I008 E1
I009 E2
I010 E3
I011 H5
I012 H6
I013 H6
I014 G7
I015 F7
I016 E6
I017 E7
I018 E7
I019 E6
I020 E7
I021 D7
I022 C5
I023 C6
I024 C7
I025 C5
I026 C7
I027 C7
I028 C8
I029 D8
I030 E8
I031 E8
I032 H9
I033 G10
I034 F9
I035 F10
I036 D10
I037 D9
I038 C10
I039 B10
I040 A8
I041 A9
I042 B9
I043 A9
I044 B9
I045 A10
I046 B10
I047 A10
I048 B10
I049 A11
I050 A12
I051 B12
I052 B12
I053 B13
I054 B12
I055 A12
I056 B12
I057 B13
I058 C11
I059 D11
I060 D11
I061 D13
I062 E12
I063 E12
I064 E11
I065 F11
I066 E12
I067 E11
I068 G11
I069 G12
I070 G13
I071 E13
I072 B13
I073 B14
I074 C14
I075 B14
I076 C6
I077 C5
I078 A11
I079 B11
I080 E10
I081 E11
I082 G10
I083 G2
I084 G2



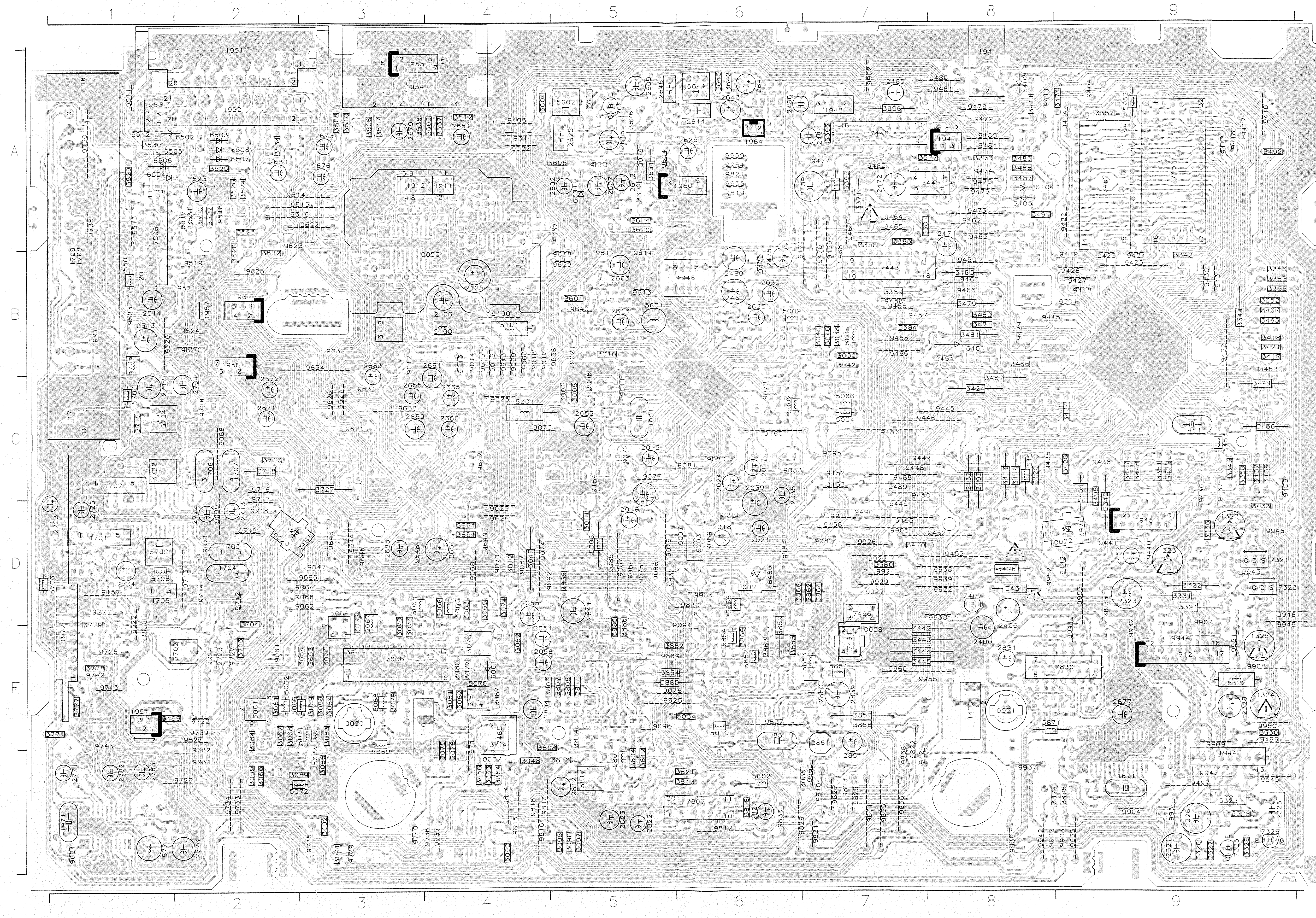
HOT CIRCUIT, BE CAREFUL AND USE AN ISOLATION TRANSFORMER WHEN SERVICING

DO NOT OPERATE WITHOUT CASE

CAUTION: LETHAL POTENTIALS AT PRIMARY

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H
7151
MC44603P
DEMAGNETICATION MANAGEMENT
REFERENCE BLOCK
SUPPLY & INITIALIZATION BLOCK
UVLO1
OSCILLATOR
BUFFER
OUTPUT
STANDBY (REDUCED FREQUENCY)
THERMAL SHUTDOWN
OVERVOLTAGE MANAGEMENT
OVERVOLTAGE PROTECTION
ERROR AMP
CURRENT SENSE
VOLTAGE FEEDBACK
E/A OUT
FOLDBACK
FOLDBACK INPUT
CURRENT SENSE INPUT
Dmax & SOFT-START CONTROL
Soft Start & Dmax
Set Latch Reset
Vdem in
Sync
Rstandby
Vosc prot
Iref
Vref
Rref
Vcc
GND
Vovp out
13,1V
2,5V
12,7V
18V
7150
STP3NA60FI
5151
CE326C2
7152
K1150PG
OPTOC
7153
TL431CLP
5V-ADJ
7154
BC327-25
7155
BC327-25
7156
BC547B
7157
BC547B
7158
STD17N06
8/17V
7159
BC547B
7160
MPSA43
7161
BC327-25
12,2V
15,5V
14,9V
4,3V
0,6V
64V
32,1V
18,5V
7,5V / 18,4V
8V / 24,7V
0,6V/8V
BYW98-200
BYV27-200
BYD33D
BYD33J
SB340
MBR1060
1N4006GP
1N4003GP
1N4148
MTZJ
BAT85
BZX79-F33
T1A25L
T100mA 19372
SIOV-S10K300
UF1922V4
DSP
1150
Mains
1154
not used
0005
viw-screening-power-supply
0010
GROUND-CONNECTOR
0021
HEATSINK
0016
CLIP
0015
0020
GND
HLEM
1115
GNDM1
GNDDC
GNDM2
33V
14VDC
14VM1
8_17VM2
28NEG
GNDD
CSW
12VA
SENSE
5V
GNDA
to Motherboard PS, 1942
F1501
F1502
F1503
F1504
F1505
F1506
F1507
F1508
F1509
F1510
F1511
F1512
F1513
F1514
F1515
F1516
F1517

## Motherboard (MOBO)



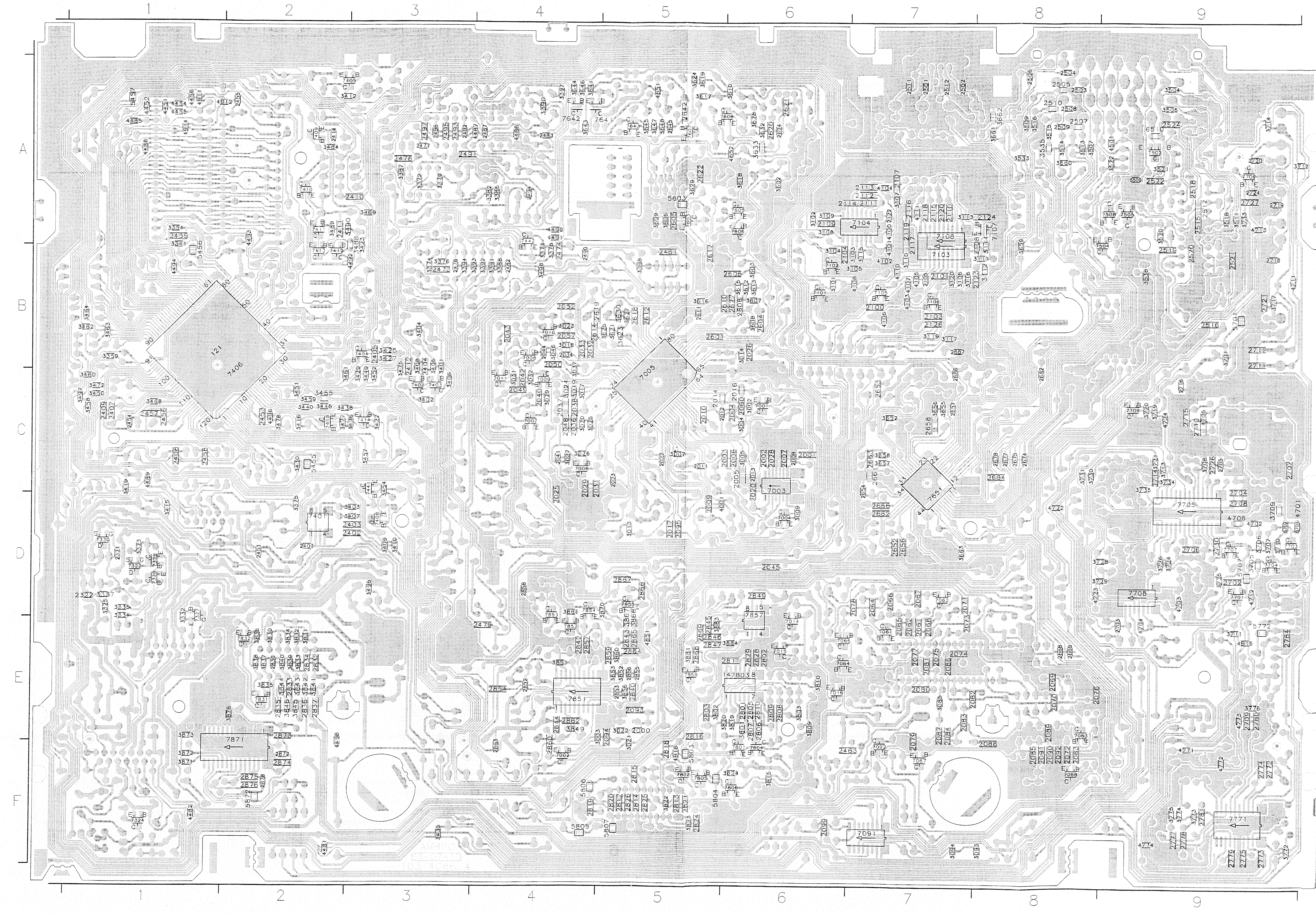
## Component Mapping Motherboard

| | |
|---|---|
| 0007 | F4 |
| 0008 | E7 |
| 0020 | D2 |
| 0021 | D6 |
| 0022 | D9 |
| 0030 | E3 |
| 0031 | E8 |
| 0050 | B4 |
| 1001 | C5 |
| 1322 | D9 |
| 1323 | D9 |
| 1324 | E9 |
| 1325 | E9 |
| 1451 | C9 |
| 1460 | E8 |
| 1461 | E3 |
| 1701 | D1 |
| 1702 | C1 |
| 1703 | D2 |
| 1704 | D2 |
| 1705 | D1 |
| 1706 | C2 |
| 1707 | C2 |
| 1708 | B1 |
| 1709 | B1 |
| 1851 | E6 |
| 1871 | F9 |
| 1911 | A4 |
| 1912 | A3 |
| 1941 | A8 |
| 1942 | E9 |
| 1944 | F9 |
| 1945 | D9 |
| 1946 | B6 |
| 1947 | A8 |
| 1948 | A7 |
| 1951 | A2 |
| 1952 | A2 |
| 1953 | A1 |
| 1954 | A3 |
| 1955 | A3 |
| 1956 | B2 |
| 1957 | B2 |
| 1960 | A6 |
| 1961 | B2 |
| 1964 | A6 |
| 1971 | F1 |
| 1972 | E1 |
| 1991 | E1 |
| 2015 | C5 |
| 2018 | D6 |
| 2019 | D5 |
| 2021 | D6 |
| 2024 | C6 |
| 2027 | C6 |
| 2030 | B6 |
| 2035 | C6 |
| 2039 | C6 |
| 2047 | D5 |
| 2053 | C5 |
| 2054 | E4 |
| 2055 | D4 |
| 2056 | E4 |
| 2106 | B4 |
| 2125 | B4 |
| 2323 | D9 |
| 2324 | F9 |
| 2325 | F9 |
| 2326 | F9 |
| 2328 | E9 |
| 2400 | E8 |
| 2406 | E8 |
| 2452 | D9 |
| 2462 | B6 |
| 2471 | A8 |
| 2472 | A7 |
| 2475 | B6 |
| 2480 | B6 |
| 2484 | A7 |
| 2485 | A7 |
| 2486 | A6 |
| 2489 | A7 |
| 2513 | B1 |
| 2514 | B1 |
| 2523 | A2 |
| 2602 | A5 |
| 2603 | B5 |
| 2607 | A5 |
| 2609 | A5 |
| 2613 | A5 |
| 2615 | A5 |
| 2616 | B5 |
| 2623 | B6 |
| 2625 | A5 |
| 2626 | A6 |
| 2641 | A6 |
| 2643 | A6 |
| 2644 | A6 |
| 2646 | A5 |
| 2651 | D4 |
| 2655 | C3 |
| 2659 | C3 |
| 2660 | C4 |
| 2664 | B4 |
| 2665 | C4 |
| 2671 | C2 |
| 2672 | C2 |
| 2673 | A3 |
| 2676 | A3 |
| 2679 | A3 |
| 2680 | A2 |
| 2681 | A4 |
| 2683 | B3 |
| 2685 | D3 |
| 2701 | C2 |
| 2713 | D2 |
| 2717 | C1 |
| 2722 | D2 |
| 2723 | D1 |
| 2725 | D1 |
| 2734 | D1 |
| 2771 | F1 |
| 2776 | F2 |
| 2782 | F1 |
| 2783 | F1 |
| 2804 | E4 |
| 2812 | F5 |
| 2822 | F5 |
| 2823 | F5 |
| 2827 | F6 |
| 2831 | E8 |
| 2839 | E7 |
| 2841 | D5 |
| 2850 | E7 |
| 2851 | F7 |
| 2861 | E7 |
| 2877 | E9 |
| 3001 | C5 |
| 3006 | C5 |
| 3008 | C5 |
| 3010 | B5 |
| 3011 | D5 |
| 3012 | D4 |
| 3030 | B7 |
| 3034 | E6 |
| 3035 | F7 |
| 3038 | B7 |
| 3040 | B7 |
| 3041 | B7 |
| 3042 | B7 |
| 3047 | D4 |
| 3048 | F4 |
| 3059 | F2 |
| 3060 | F2 |
| 3061 | E2 |
| 3062 | E4 |
| 3063 | D4 |
| 3064 | E2 |
| 3065 | D4 |
| 3066 | D4 |
| 3067 | E2 |
| 3068 | E2 |
| 3069 | E3 |
| 3070 | E3 |
| 3071 | E3 |
| 3072 | E3 |
| 3073 | E3 |
| 3074 | D4 |
| 3075 | F4 |
| 3076 | E4 |
| 3077 | E4 |
| 3078 | F4 |
| 3079 | E3 |
| 3080 | E4 |
| 3081 | E4 |
| 3082 | E4 |
| 3083 | E3 |
| 3084 | E3 |
| 3086 | F3 |
| 3087 | E4 |
| 3088 | E3 |
| 3089 | F3 |
| 3090 | F4 |
| 3091 | F3 |
| 3092 | F3 |
| 3095 | F5 |
| 3096 | F5 |
| 3097 | F5 |
| 3118 | B3 |
| 3321 | D9 |
| 3322 | D9 |
| 3326 | F9 |
| 3327 | F9 |
| 3328 | F9 |
| 3329 | F9 |
| 3330 | E9 |
| 3331 | D9 |
| 3336 | D9 |
| 3340 | D9 |
| 3342 | B9 |
| 3344 | B9 |
| 3345 | C9 |
| 3351 | C9 |
| 3352 | B9 |
| 3353 | B9 |
| 3355 | B9 |
| 3356 | B9 |
| 3357 | A9 |
| 3358 | C9 |
| 3363 | F4 |
| 3364 | F4 |
| 3370 | A8 |
| 3371 | A7 |
| 3377 | A8 |
| 3380 | D7 |
| 3381 | A7 |
| 3383 | A7 |
| 3384 | B7 |
| 3386 | A7 |
| 3389 | B7 |
| 3395 | A7 |
| 3396 | A7 |
| 3399 | A7 |
| 3411 | A8 |
| 3413 | C8 |
| 3414 | C8 |
| 3417 | B9 |
| 3418 | B9 |
| 3420 | C8 |
| 3421 | B9 |
| 3424 | C8 |
| 3426 | D8 |
| 3428 | C9 |
| 3431 | D8 |
| 3432 | C8 |
| 3433 | D9 |
| 3434 | C9 |
| 3436 | C9 |
| 3437 | C9 |
| 3439 | C9 |
| 3441 | C9 |
| 3442 | E7 |
| 3443 | E7 |
| 3444 | E7 |
| 3445 | E7 |
| 3447 | C9 |
| 3448 | C9 |
| 3453 | B9 |
| 3456 | F4 |
| 3465 | B9 |
| 3466 | B8 |
| 3467 | B9 |
| 3470 | D7 |
| 3471 | B8 |
| 3473 | C9 |
| 3474 | A9 |
| 3479 | B8 |
| 3480 | B8 |
| 3481 | B8 |
| 3482 | C8 |
| 3483 | B8 |
| 3485 | A8 |
| 3486 | A8 |
| 3487 | A8 |
| 3491 | A8 |
| 3492 | A9 |
| 3493 | C8 |
| 3495 | D9 |
| 3499 | E1 |
| 3503 | A4 |
| 3506 | A3 |
| 3508 | A3 |
| 3510 | A3 |
| 3512 | A4 |
| 3517 | A3 |
| 3519 | A2 |
| 3523 | A2 |
| 3524 | A2 |
| 3525 | A2 |
| 3526 | B2 |
| 3527 | A2 |
| 3528 | A2 |
| 3529 | A1 |
| 3530 | A1 |
| 3531 | A2 |
| 3532 | B2 |
| 3534 | A2 |
| 3536 | A3 |
| 3537 | A4 |
| 3601 | B5 |
| 3604 | A4 |
| 3605 | A5 |
| 3611 | A5 |
| 3614 | A5 |
| 3620 | A5 |
| 3622 | A5 |
| 3626 | A5 |
| 3631 | A5 |
| 3640 | A6 |
| 3642 | A6 |
| 3651 | D4 |
| 3653 | E3 |
| 3654 | E3 |
| 3664 | D4 |
| 3702 | E2 |
| 3703 | E2 |
| 3704 | E2 |
| 3715 | C1 |
| 3716 | C2 |
| 3718 | C2 |
| 3722 | C1 |
| 3727 | C3 |
| 3771 | E1 |
| 3777 | E1 |
| 3778 | E1 |
| 3779 | E1 |
| 3804 | F5 |
| 3805 | E5 |
| 3806 | E4 |
| 3807 | E5 |
| 3808 | F4 |
| 3811 | E5 |
| 3812 | F5 |
| 3813 | F6 |
| 3814 | E5 |
| 3816 | F5 |
| 3817 | F5 |
| 3818 | F6 |
| 3821 | F6 |
| 3854 | E5 |
| 3855 | D5 |
| 3857 | E7 |
| 3858 | E7 |
| 3859 | E6 |
| 3862 | D7 |
| 3863 | E6 |
| 3864 | D7 |
| 3865 | E6 |
| 3866 | D6 |
| 3869 | E6 |
| 3874 | F8 |
| 3875 | F9 |
| 3880 | E5 |
| 3882 | E5 |
| 3885 | E5 |
| 3886 | E5 |
| 5001 | C4 |
| 5002 | C6 |
| 5003 | D6 |
| 5004 | C7 |
| 5005 | B7 |
| 5006 | C7 |
| 5008 | D5 |
| 5009 | B6 |
| 5010 | E6 |
| 5061 | E2 |
| 5062 | E2 |
| 5063 | D4 |
| 5064 | D3 |
| 5065 | D3 |
| 5066 | E2 |
| 5067 | E3 |
| 5068 | E3 |
| 5069 | F3 |
| 5070 | E4 |
| 5071 | E3 |
| 5072 | F3 |
| 5073 | F3 |
| 5100 | B4 |
| 5101 | B4 |
| 5322 | E9 |
| 5323 | F9 |
| 5451 | C8 |
| 5452 | A9 |
| 5453 | C9 |
| 5454 | C9 |
| 5471 | A7 |
| 5501 | B1 |
| 5601 | B5 |
| 5602 | A5 |
| 5641 | A6 |
| 5702 | D1 |
| 5703 | C1 |
| 5704 | C1 |
| 5705 | B1 |
| 5706 | D1 |
| 5708 | D1 |
| 5771 | F1 |
| 5801 | F5 |
| 5802 | F6 |
| 5851 | E7 |
| 5852 | E6 |
| 5853 | E7 |
| 5854 | E6 |
| 5856 | D6 |
| 5871 | E8 |
| 6061 | E4 |
| 6401 | B8 |
| 6402 | A8 |
| 6404 | A8 |
| 6405 | A8 |
| 6460 | D6 |
| 6502 | A2 |
| 6503 | A2 |
| 6504 | A1 |
| 6505 | A1 |
| 6506 | A1 |
| 6507 | A2 |
| 6508 | A2 |
| 6601 | A5 |
| 7066 | E3 |
| 7321 | D9 |
| 7323 | D9 |
| 7325 | F9 |
| 7326 | F9 |
| 7407 | D8 |
| 7440 | A8 |
| 7443 | B7 |
| 7446 | A7 |
| 7451 | A9 |
| 7452 | A9 |
| 7461 | D3 |
| 7462 | D9 |
| 7464 | E7 |
| 7465 | E4 |
| 7466 | D7 |
| 7506 | A1 |
| 7604 | A5 |
| 7807 | F6 |
| 7830 | E9 |
| 9012 | B3 |
| 9013 | B4 |
| 9014 | B4 |
| 9015 | B4 |
| 9016 | B4 |
| 9017 | B4 |
| 9018 | B4 |
| 9019 | A5 |
| 9021 | B5 |
| 9022 | A4 |
| 9023 | D4 |
| 9024 | D4 |
| 9025 | C4 |
| 9061 | E2 |
| 9062 | D3 |
| 9063 | B4 |
| 9064 | D3 |
| 9065 | D3 |
| 9066 | D3 |
| 9067 | D4 |
| 9068 | D4 |
| 9069 | B4 |
| 9070 | D4 |
| 9071 | D2 |
| 9072 | C5 |
| 9073 | C4 |
| 9074 | D4 |
| 9075 | D5 |
| 9076 | E5 |
| 9077 | C5 |
| 9078 | C6 |
| 9079 | D5 |
| 9080 | C6 |
| 9081 | C6 |
| 9082 | D7 |
| 9083 | C6 |
| 9084 | D5 |
| 9085 | D5 |
| 9086 | D5 |
| 9087 | D5 |
| 9088 | C2 |
| 9089 | D6 |
| 9090 | D6 |
| 9091 | E1 |
| 9092 | D4 |
| 9094 | E6 |
| 9095 | C7 |
| 9097 | D6 |
| 9098 | E5 |
| 9099 | D2 |
| 9100 | B4 |
| 9152 | C7 |
| 9153 | C7 |
| 9154 | C5 |
| 9155 | D7 |
| 9157 | D1 |
| 9158 | D7 |
| 9159 | D6 |
| 9160 | C6 |
| 9301 | B9 |
| 9403 | A4 |
| 9404 | A9 |
| 9411 | A8 |
| 9414 | A9 |
| 9415 | B8 |
| 9416 | A9 |
| 9417 | A9 |
| 9418 | A9 |
| 9419 | B9 |
| 9421 | F7 |
| 9422 | A9 |
| 9423 | B9 |
| 9424 | B9 |
| 9425 | B9 |
| 9426 | B9 |
| 9427 | B9 |
| 9428 | B9 |
| 9429 | B8 |
| 9430 | B9 |
| 9431 | B9 |
| 9432 | B9 |
| 9433 | A9 |
| 9435 | C8 |
| 9436 | C9 |
| 9437 | C9 |
| 9438 | C9 |
| 9439 | C9 |
| 9440 | D9 |
| 9441 | D9 |
| 9442 | D9 |
| 9445 | C8 |
| 9446 | C7 |
| 9447 | C7 |
| 9448 | C7 |
| 9449 | D7 |
| 9450 | C7 |
| 9452 | D8 |
| 9453 | D8 |
| 9454 | B8 |
| 9455 | B7 |
| 9456 | B7 |
| 9457 | B7 |
| 9458 | B7 |
| 9459 | B8 |
| 9460 | B8 |
| 9462 | A8 |
| 9463 | A8 |
| 9464 | A7 |
| 9465 | A7 |
| 9466 | B8 |
| 9467 | A7 |
| 9468 | B7 |
| 9469 | B7 |
| 9470 | B7 |
| 9471 | B6 |
| 9472 | B6 |
| 9473 | A8 |
| 9474 | A8 |
| 9475 | A8 |
| 9476 | A8 |
| 9477 | A7 |
| 9478 | A8 |
| 9479 | A8 |
| 9480 | A8 |
| 9481 | A8 |
| 9483 | A7 |
| 9484 | A8 |
| 9485 | A8 |
| 9486 | B7 |
| 9487 | C7 |
| 9488 | C7 |
| 9489 | C7 |
| 9490 | D7 |
| 9495 | D7 |
| 9496 | E9 |
| 9497 | F9 |
| 9511 | A1 |
| 9512 | A1 |
| 9513 | A1 |
| 9514 | A2 |
| 9515 | A3 |
| 9516 | A3 |
| 9517 | A2 |
| 9518 | A2 |
| 9519 | B2 |
| 9520 | B1 |
| 9521 | B2 |
| 9522 | E1 |
| 9523 | B1 |
| 9524 | B2 |
| 9601 | A5 |
| 9604 | A5 |
| 9611 | A4 |
| 9612 | B5 |
| 9613 | B5 |
| 9614 | B5 |
| 9621 | C3 |
| 9622 | A3 |
| 9623 | A2 |
| 9624 | F1 |
| 9625 | B2 |
| 9626 | C3 |
| 9627 | C3 |
| 9631 | C3 |
| 9632 | B3 |
| 9633 | C3 |
| 9634 | B3 |
| 9636 | B5 |
| 9637 | A5 |
| 9638 | B5 |
| 9639 | B5 |
| 9640 | B5 |
| 9641 | C5 |
| 9642 | C4 |
| 9643 | B4 |
| 9644 | D3 |
| 9645 | D3 |
| 9646 | D3 |
| 9647 | D3 |
| 9648 | D3 |
| 9649 | D4 |
| 9711 | B1 |
| 9712 | D2 |
| 9713 | D2 |
| 9714 | D2 |
| 9715 | E1 |
| 9716 | C2 |
| 9717 | D2 |
| 9718 | D2 |
| 9719 | D2 |
| 9721 | D1 |
| 9722 | E2 |
| 9723 | E2 |
| 9724 | E2 |
| 9725 | E1 |
| 9726 | F2 |
| 9727 | E2 |
| 9728 | C2 |
| 9729 | F3 |
| 9730 | A1 |
| 9731 | F2 |
| 9732 | F2 |
| 9733 | F2 |
| 9734 | F2 |
| 9735 | F3 |
| 9736 | F4 |
| 9737 | F4 |
| 9738 | A1 |
| 9739 | E2 |
| 9740 | F3 |
| 9741 | E4 |
| 9742 | E1 |
| 9743 | E1 |
| 9813 | F4 |
| 9814 | F4 |
| 9815 | F4 |
| 9816 | F4 |
| 9817 | F6 |
| 9818 | F4 |
| 9819 | A6 |
| 9820 | B2 |
| 9821 | A6 |
| 9822 | F7 |
| 9823 | F7 |
| 9824 | F7 |
| 9825 | F7 |
| 9826 | F7 |
| 9827 | E2 |
| 9829 | F6 |
| 9830 | D6 |
| 9831 | F7 |
| 9832 | D5 |
| 9833 | F6 |
| 9835 | F7 |
| 9836 | F7 |
| 9837 | E6 |
| 9838 | F7 |
| 9839 | E5 |
| 9902 | F8 |
| 9903 | F9 |
| 9904 | F9 |
| 9905 | D7 |
| 9907 | E9 |
| 9908 | E9 |
| 9909 | E9 |
| 9922 | D8 |
| 9923 | D7 |
| 9924 | D7 |
| 9925 | E5 |
| 9926 | D7 |
| 9927 | D7 |
| 9929 | D7 |
| 9932 | E9 |
| 9933 | D9 |
| 9934 | F9 |
| 9935 | F9 |
| 9936 | F8 |
| 9937 | F8 |
| 9938 | D8 |
| 9939 | D8 |
| 9940 | F7 |
| 9941 | E9 |
| 9942 | F8 |
| 9943 | D9 |
| 9944 | E9 |
| 9945 | F9 |
| 9946 | D9 |
| 9947 | F9 |
| 9948 | D9 |
| 9949 | E9 |
| 9950 | E9 |
| 9951 | E9 |
| 9952 | D8 |
| 9953 | D9 |
| 9954 | A6 |
| 9955 | A6 |
| 9956 | E8 |
| 9958 | D8 |
| 9959 | A6 |
| 9960 | E7 |
| 9962 | A7 |
| 9963 | D6 |
| 9965 | F7 |

# Component Mapping Motherboard

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2000 | E5 | 2479 | E4 | 2834 | E2 | 3446 | C2 | 3834 | E2 | 7106 | B7 |
| 2001 | C6 | 2482 | B4 | 2835 | E2 | 3449 | C3 | 3835 | E2 | 7107 | A8 |
| 2002 | C6 | 2483 | A4 | 2836 | E2 | 3450 | C1 | 3836 | E2 | 7108 | A7 |
| 2003 | C5 | 2487 | A4 | 2837 | E2 | 3451 | C2 | 3837 | E2 | 7322 | D1 |
| 2004 | C6 | 2490 | B4 | 2840 | E5 | 3452 | C3 | 3838 | E2 | 7324 | F1 |
| 2005 | C6 | 2491 | A3 | 2842 | E4 | 3454 | C3 | 3839 | E2 | 7327 | D1 |
| 2006 | C6 | 2492 | A3 | 2843 | E5 | 3455 | C2 | 3840 | E2 | 7328 | D1 |
| 2007 | C6 | 2493 | A3 | 2844 | E4 | 3457 | C3 | 3841 | E2 | 7329 | D1 |
| 2008 | C6 | 2494 | A4 | 2845 | E5 | 3458 | C1 | 3842 | E2 | 7330 | D1 |
| 2009 | D5 | 2495 | A3 | 2846 | E5 | 3459 | C2 | 3843 | E2 | 7401 | D2 |
| 2010 | C5 | 2496 | A3 | 2847 | E5 | 3460 | C1 | 3844 | E2 | 7402 | C3 |
| 2011 | C5 | 2497 | A3 | 2849 | D6 | 3461 | C2 | 3845 | E2 | 7403 | C3 |
| 2012 | C5 | 2501 | A7 | 2852 | E4 | 3462 | B1 | 3846 | E2 | 7404 | B3 |
| 2013 | C6 | 2502 | A7 | 2853 | E5 | 3463 | B1 | 3849 | E4 | 7405 | A2 |
| 2014 | C5 | 2503 | A8 | 2854 | E4 | 3464 | B1 | 3851 | E4 | 7406 | C2 |
| 2016 | C6 | 2504 | A8 | 2855 | E5 | 3468 | C1 | 3852 | E5 | 7408 | D3 |
| 2017 | D5 | 2505 | A8 | 2856 | E5 | 3469 | A3 | 3853 | E5 | 7409 | A2 |
| 2020 | C6 | 2506 | A8 | 2857 | E4 | 3472 | C1 | 3856 | E5 | 7410 | A2 |
| 2022 | C5 | 2507 | A8 | 2858 | D4 | 3475 | B3 | 3860 | E5 | 7411 | A2 |
| 2023 | C5 | 2508 | A8 | 2859 | E5 | 3476 | C3 | 3861 | D4 | 7412 | B2 |
| 2025 | D4 | 2509 | A8 | 2860 | F4 | 3477 | C2 | 3867 | E5 | 7413 | B2 |
| 2026 | B6 | 2510 | A8 | 2862 | E4 | 3478 | C2 | 3868 | E5 | 7414 | C3 |
| 2028 | C6 | 2511 | A7 | 2863 | F4 | 3484 | A2 | 3870 | D5 | 7415 | C2 |
| 2029 | C4 | 2512 | A7 | 2864 | E5 | 3488 | B3 | 3871 | F1 | 7441 | C3 |
| 2031 | C4 | 2515 | A9 | 2865 | E5 | 3489 | A2 | 3872 | F1 | 7442 | A4 |
| 2032 | B4 | 2516 | B9 | 2866 | D5 | 3490 | A2 | 3873 | E1 | 7502 | A9 |
| 2033 | B4 | 2517 | A9 | 2867 | D5 | 3496 | D3 | 3876 | E2 | 7504 | A9 |
| 2034 | B4 | 2518 | A9 | 2868 | E5 | 3497 | C1 | 3881 | E5 | 7505 | A9 |
| 2036 | C4 | 2519 | B9 | 2869 | E5 | 3498 | B4 | 3883 | E5 | 7508 | A9 |
| 2037 | C4 | 2520 | B9 | 2872 | F2 | 3504 | A9 | 3884 | E6 | 7603 | A5 |
| 2038 | C4 | 2521 | B9 | 2873 | E2 | 3505 | A9 | 4001 | D5 | 7605 | A6 |
| 2040 | C4 | 2522 | A9 | 2874 | F2 | 3507 | A8 | 4100 | A7 | 7606 | A6 |
| 2041 | C4 | 2524 | A9 | 2875 | F2 | 3509 | A8 | 4101 | B7 | 7607 | A5 |
| 2042 | C4 | 2601 | B5 | 2876 | F2 | 3511 | A9 | 4102 | B7 | 7608 | A5 |
| 2043 | B4 | 2604 | B6 | 2878 | F2 | 3513 | A8 | 4103 | B7 | 7641 | A5 |
| 2044 | B4 | 2605 | A5 | 3002 | C6 | 3514 | A8 | 4104 | A7 | 7642 | A4 |
| 2045 | D6 | 2606 | B6 | 3003 | E5 | 3515 | A8 | 4105 | B7 | 7643 | A5 |
| 2048 | C4 | 2608 | B6 | 3004 | C6 | 3516 | A8 | 4106 | B7 | 7651 | C7 |
| 2049 | C4 | 2610 | B5 | 3005 | C6 | 3518 | A9 | 4107 | B7 | 7701 | D9 |
| 2050 | B4 | 2611 | B5 | 3007 | C5 | 3520 | A9 | 4108 | B7 | 7703 | D9 |
| 2052 | B4 | 2612 | B5 | 3009 | D6 | 3521 | A9 | 4110 | B7 | 7704 | D9 |
| 2057 | B4 | 2614 | B4 | 3013 | D5 | 3522 | A9 | 4111 | A7 | 7705 | D9 |
| 2060 | C6 | 2617 | B5 | 3014 | B6 | 3533 | A8 | 4451 | A1 | 7706 | C9 |
| 2061 | E7 | 2618 | B5 | 3017 | C4 | 3535 | A8 | 4452 | A1 | 7707 | D9 |
| 2062 | E7 | 2619 | B4 | 3018 | B4 | 3538 | B9 | 4454 | A1 | 7708 | D9 |
| 2063 | F8 | 2620 | A6 | 3019 | C4 | 3602 | A6 | 4455 | A1 | 7709 | A9 |
| 2064 | D7 | 2621 | A6 | 3020 | C4 | 3603 | B6 | 4456 | A1 | 7771 | F9 |
| 2065 | E7 | 2622 | A5 | 3021 | F5 | 3606 | A5 | 4481 | F2 | 7801 | F6 |
| 2066 | D7 | 2624 | A6 | 3022 | E5 | 3607 | B6 | 4482 | F1 | 7802 | F5 |
| 2067 | D7 | 2627 | B6 | 3023 | B4 | 3608 | B6 | 4485 | A1 | 7803 | E6 |
| 2068 | E7 | 2642 | A5 | 3024 | C4 | 3609 | A5 | 4486 | A4 | 7804 | F6 |
| 2069 | E8 | 2645 | A5 | 3025 | C4 | 3610 | A6 | 4487 | A3 | 7805 | F5 |
| 2070 | E8 | 2652 | D7 | 3026 | C4 | 3612 | B6 | 4488 | A1 | 7806 | F6 |
| 2071 | D7 | 2653 | C7 | 3027 | C4 | 3613 | B6 | 4489 | C1 | 7831 | E2 |
| 2072 | F8 | 2654 | C7 | 3029 | C4 | 3615 | B6 | 4490 | A4 | 7832 | E2 |
| 2073 | E7 | 2656 | D7 | 3031 | C4 | 3616 | B5 | 4491 | A4 | 7851 | E4 |
| 2074 | E7 | 2657 | C7 | 3032 | C4 | 3617 | A5 | 4492 | B2 | 7852 | E4 |
| 2075 | E7 | 2658 | C7 | 3037 | B4 | 3618 | A6 | 4493 | A2 | 7853 | D4 |
| 2076 | E8 | 2661 | C7 | 3046 | B4 | 3619 | A5 | 4494 | B1 | 7854 | D4 |
| 2077 | E7 | 2662 | D7 | 3085 | E7 | 3621 | B5 | 4496 | C2 | 7855 | D5 |
| 2078 | D7 | 2663 | C7 | 3093 | F8 | 3623 | B5 | 4498 | E2 | 7856 | E5 |
| 2079 | E7 | 2666 | D7 | 3094 | F7 | 3624 | A5 | 4501 | A9 | 7857 | D6 |
| 2080 | E7 | 2668 | E8 | 3101 | B6 | 3625 | B5 | 4651 | A5 | 7871 | E2 |
| 2081 | E7 | 2669 | E8 | 3102 | A6 | 3627 | B5 | 4652 | A6 | | |
| 2082 | E7 | 2674 | C8 | 3103 | B7 | 3628 | A6 | 4701 | D9 | | |
| 2083 | E7 | 2675 | C8 | 3104 | B6 | 3629 | A5 | 4702 | D9 | | |
| 2084 | E7 | 2677 | C8 | 3105 | B7 | 3630 | B5 | 4703 | D9 | | |
| 2085 | F8 | 2678 | C8 | 3106 | B7 | 3632 | A6 | 4704 | E9 | | |
| 2086 | E7 | 2682 | C8 | 3107 | A7 | 3633 | A6 | 4705 | C9 | | |
| 2087 | E7 | 2684 | C8 | 3108 | A6 | 3641 | A4 | 4706 | D9 | | |
| 2088 | E8 | 2686 | C7 | 3109 | A6 | 3643 | A4 | 4711 | B9 | | |
| 2089 | E8 | 2687 | B7 | 3110 | B7 | 3644 | A4 | 4712 | D9 | | |
| 2090 | F8 | 2702 | D9 | 3111 | B8 | 3645 | A5 | 4713 | A9 | | |
| 2091 | F8 | 2703 | E9 | 3112 | B8 | 3646 | A4 | 4722 | D8 | | |
| 2092 | F8 | 2704 | C9 | 3113 | A7 | 3647 | A5 | 4723 | D8 | | |
| 2093 | E5 | 2705 | C9 | 3114 | A8 | 3648 | A5 | 4724 | C9 | | |
| 2094 | E5 | 2706 | D9 | 3115 | B7 | 3652 | C7 | 4771 | F9 | | |
| 2095 | D5 | 2707 | C9 | 3116 | B7 | 3655 | C7 | 4772 | F9 | | |
| 2099 | F6 | 2708 | D9 | 3117 | B7 | 3656 | C7 | 4773 | E9 | | |
| 2100 | B7 | 2709 | E9 | 3119 | B7 | 3657 | C7 | 4774 | F9 | | |
| 2101 | B7 | 2710 | C9 | 3120 | B7 | 3658 | C7 | 4851 | E5 | | |
| 2103 | B7 | 2711 | B9 | 3323 | D1 | 3659 | A8 | 4911 | A1 | | |
| 2104 | B6 | 2712 | B9 | 3325 | D1 | 3660 | A8 | 4912 | A1 | | |
| 2105 | B7 | 2714 | C9 | 3332 | D1 | 3661 | A8 | 4914 | A1 | | |
| 2107 | A7 | 2715 | C9 | 3334 | D1 | 3662 | A8 | 4915 | E9 | | |
| 2108 | A8 | 2716 | C9 | 3335 | D1 | 3663 | D7 | 4916 | F5 | | |
| 2109 | A6 | 2718 | B9 | 3337 | D1 | 3701 | B9 | 5455 | C2 | | |
| 2110 | A7 | 2719 | A9 | 3341 | A1 | 3705 | D9 | 5456 | B1 | | |
| 2111 | A7 | 2720 | A9 | 3354 | A1 | 3706 | D9 | 5457 | A1 | | |
| 2112 | A7 | 2721 | B9 | 3359 | B1 | 3707 | D9 | 5603 | A5 | | |
| 2113 | A7 | 2724 | A9 | 3372 | A3 | 3708 | C9 | 5701 | B9 | | |
| 2114 | A6 | 2726 | C9 | 3373 | B4 | 3709 | D9 | 5707 | D9 | | |
| 2115 | A7 | 2727 | A9 | 3374 | B3 | 3710 | D9 | 5772 | E9 | | |
| 2116 | A7 | 2730 | D9 | 3375 | D2 | 3711 | E9 | 5803 | F5 | | |
| 2117 | A7 | 2772 | F9 | 3376 | B3 | 3712 | A9 | 5804 | F5 | | |
| 2118 | A7 | 2773 | F9 | 3378 | B4 | 3713 | C9 | 5805 | F4 | | |
| 2119 | A7 | 2774 | F9 | 3379 | A3 | 3714 | A9 | 5806 | F4 | | |
| 2120 | A7 | 2775 | F9 | 3382 | A4 | 3717 | B9 | 5807 | F5 | | |
| 2122 | A7 | 2777 | F9 | 3385 | A4 | 3719 | C9 | 5872 | F2 | | |
| 2123 | B7 | 2778 | F9 | 3387 | A3 | 3720 | C9 | 6509 | A9 | | |
| 2124 | A8 | 2779 | F9 | 3388 | B4 | 3721 | C9 | 6510 | A9 | | |
| 2126 | B7 | 2780 | E9 | 3390 | A4 | 3724 | D9 | 6701 | D9 | | |
| 2321 | D1 | 2781 | F9 | 3391 | B4 | 3725 | D9 | 6702 | D9 | | |
| 2322 | D1 | 2784 | E9 | 3392 | B4 | 3726 | D9 | 7001 | C6 | | |
| 2401 | D2 | 2801 | E6 | 3393 | B3 | 3728 | D9 | 7002 | F4 | | |
| 2402 | D3 | 2802 | E6 | 3394 | B3 | 3729 | D8 | 7003 | C6 | | |
| 2403 | D3 | 2803 | E5 | 3397 | A4 | 3730 | C8 | 7004 | D6 | | |
| 2404 | B3 | 2805 | E6 | 3398 | B5 | 3731 | C8 | 7005 | C5 | | |
| 2405 | B3 | 2806 | E6 | 3401 | B3 | 3733 | A9 | 7006 | C4 | | |
| 2407 | C1 | 2807 | E6 | 3402 | C3 | 3734 | C9 | 7007 | C4 | | |
| 2408 | C1 | 2808 | E6 | 3403 | D3 | 3735 | C9 | 7008 | B4 | | |
| 2409 | C1 | 2809 | E6 | 3404 | B3 | 3772 | F9 | 7009 | C4 | | |
| 2410 | A3 | 2810 | E6 | 3405 | B3 | 3773 | F9 | 7010 | B4 | | |
| 2411 | A2 | 2811 | E6 | 3406 | C3 | 3774 | F9 | 7011 | C4 | | |
| 2412 | B3 | 2813 | F5 | 3407 | D3 | 3775 | F9 | 7014 | E6 | | |
| 2414 | A2 | 2814 | F5 | 3408 | B3 | 3776 | E9 | 7015 | E6 | | |
| 2451 | D2 | 2815 | F5 | 3409 | D3 | 3801 | E6 | 7016 | E6 | | |
| 2453 | C2 | 2816 | E5 | 3410 | D3 | 3802 | E5 | 7061 | E7 | | |
| 2454 | C1 | 2817 | F5 | 3412 | A2 | 3803 | E6 | 7062 | D7 | | |
| 2455 | A2 | 2818 | F5 | 3415 | D1 | 3809 | E6 | 7063 | E8 | | |
| 2456 | C1 | 2819 | F4 | 3416 | C2 | 3810 | E6 | 7064 | E6 | | |
| 2457 | C1 | 2820 | F5 | 3419 | C1 | 3815 | F6 | 7065 | E6 | | |
| 2458 | C1 | 2821 | F5 | 3422 | C3 | 3819 | E6 | 7067 | F7 | | |
| 2459 | A1 | 2824 | F5 | 3423 | B3 | 3820 | E6 | 7068 | F8 | | |
| 2461 | B5 | 2825 | F5 | 3425 | B3 | 3822 | F5 | 7091 | F7 | | |
| 2463 | F7 | 2826 | F5 | 3427 | B3 | 3823 | F5 | 7092 | F7 | | |
| 2473 | B3 | 2828 | E6 | 3429 | C3 | 3824 | F6 | 7101 | B6 | | |
| 2474 | B4 | 2829 | E6 | 3430 | C2 | 3830 | E2 | 7102 | B6 | | |
| 2476 | B3 | 2830 | E2 | 3435 | F3 | 3831 | E2 | 7103 | B7 | | |
| 2477 | A3 | 2832 | E2 | 3438 | C2 | 3832 | E2 | 7104 | A7 | | |
| 2478 | A3 | 2833 | E2 | 3440 | C2 | 3833 | E2 | 7105 | B7 | | |

## Motherboard (MOBO)

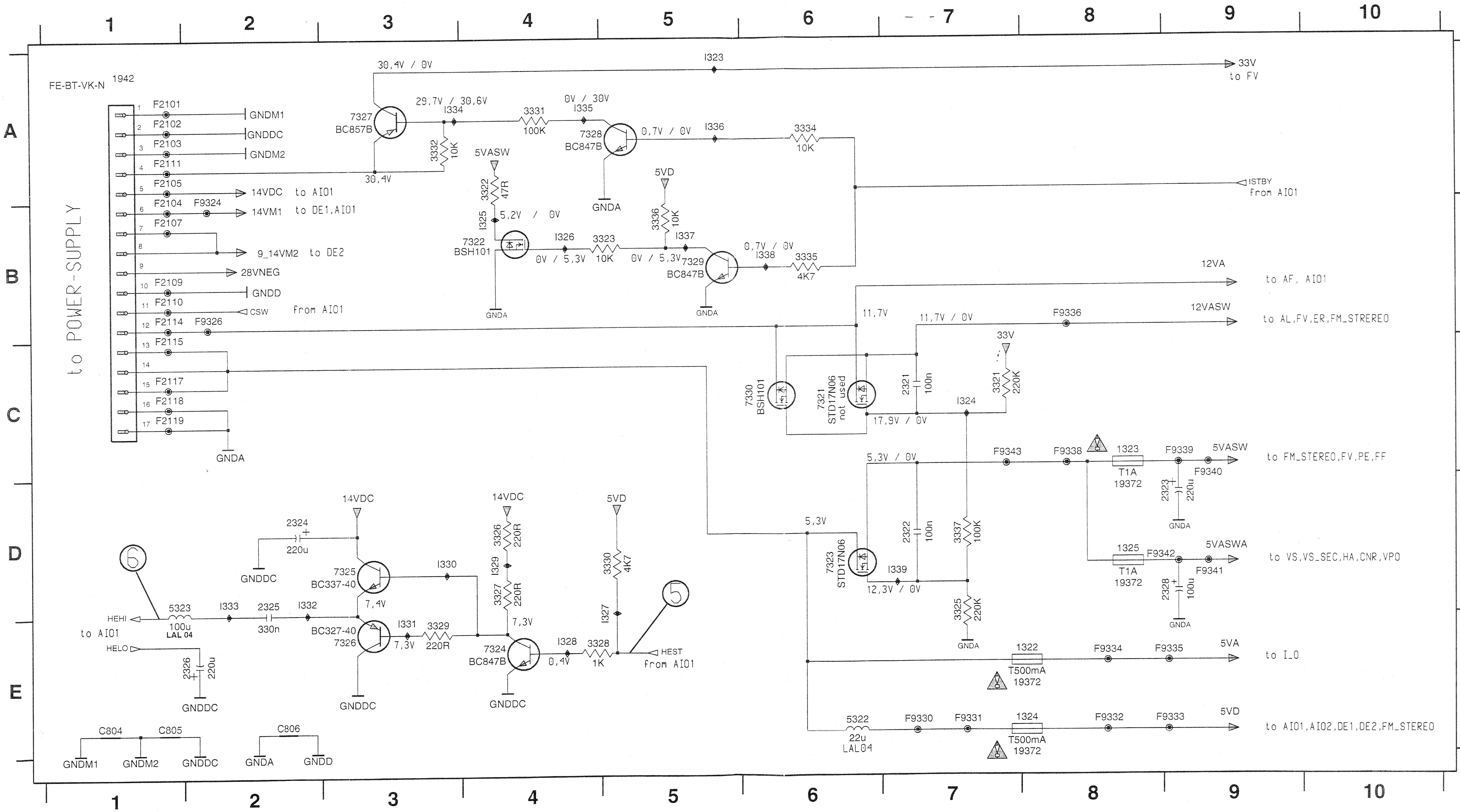

1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
7406
7005
7651
7705
7708
7771
7871
7851
7857
7091
7104
7106
7103

## Supply Part (PS)

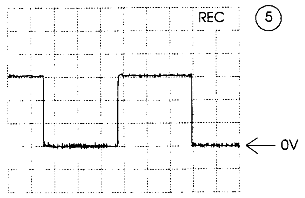
**Interconnections Manual Page**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF | 3-26 | AIO2 | 3-41 | CNR | 3-36 | DE | 3-42 | FF | 3-43 | FOME | 3-44 | HA | 3-32 | PE | 3-40 | QNIC | 3-46 | VS | 3-31 |
| AIO1 | 3-38 | AL | 3-28 | DC | 3-48 | ER | 3-27 | FM_STEREO | 3-25 | FV | 3-24 | I_O | 3-37 | PS | 3-22 | VPO | 3-45 | VS_SEC | 3-35 |

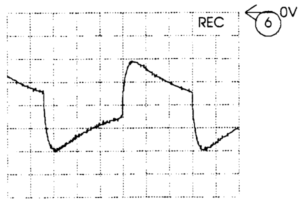
| | |
|---|---|
| 1323 | C8 |
| 1324 | E8 |
| 1325 | D8 |
| 2321 | C7 |
| 2322 | D7 |
| 2323 | D9 |
| 2325 | D2 |
| 2326 | E2 |
| 2328 | D9 |
| 3322 | A4 |
| 3323 | B5 |
| 3325 | D7 |
| 3327 | D4 |
| 3328 | E4 |
| 3329 | E3 |
| 3331 | A4 |
| 3332 | A3 |
| 3334 | A6 |
| 3336 | B5 |
| 3337 | D7 |
| 5322 | E6 |
| 7321 | C6 |
| 7322 | B4 |
| 7323 | D6 |
| 7325 | D3 |
| 7326 | E3 |
| 7327 | A3 |
| 7329 | B5 |
| 7330 | C6 |
| C804 | E1 |
| C806 | E2 |
| F2101 | A1 |
| F2102 | A1 |
| F2104 | B1 |
| F2105 | A1 |
| F2107 | B1 |
| F2110 | B1 |
| F2111 | A1 |
| F2114 | B1 |
| F2117 | C1 |
| F2118 | C1 |
| F2119 | C1 |
| F9326 | B2 |
| F9330 | E7 |
| F9331 | E7 |
| F9333 | E9 |
| F9334 | E8 |
| F9335 | E9 |
| F9338 | C8 |
| F9339 | C9 |
| F9340 | D9 |
| F9342 | D8 |
| F9343 | C7 |
| I323 | A5 |
| I325 | B4 |
| I326 | B4 |
| I327 | D5 |
| I329 | D4 |
| I330 | D3 |
| I331 | E3 |
| I333 | D2 |
| I334 | A3 |
| I335 | A4 |
| I337 | B5 |
| I338 | B6 |
| I339 | D7 |


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
FE-BT-VK-N
1942
to POWER-SUPPLY
F2101
GNDM1
F2102
GNDDC
F2103
GNDM2
F2111
F2105
14VDC to AIO1
F2104
F9324
14VM1 to DE1,AIO1
F2107
9_14VM2 to DE2
28VNEG
F2109
GNDD
F2110
CSW
from AIO1
F2114
F9326
F2115
F2117
F2118
F2119
GNDA
30,4V / 0V
I323
33V
to FV
7327
BC857B
29,7V / 30,6V
I334
3332
10K
30,4V
3331
100K
0V / 30V
I335
7328
BC847B
0,7V / 0V
I336
3334
10K
GNDA
5VASW
3322
47R
I325
5,2V / 0V
7322
BSH101
I326
3323
10K
0V / 5,3V
0V / 5,3V
5VD
3336
10K
I337
7329
BC847B
0,7V / 0V
I338
3335
4K7
ISTBY
from AIO1
12VA
to AF, AIO1
11,7V
11,7V / 0V
F9336
12VASW
to AL,FV,ER,FM_STEREO
33V
3321
220K
7330
BSH101
7321
STD17N06
not used
2321
100n
I324
17,9V / 0V
5,3V / 0V
F9343
F9338
1323
T1A
19372
F9339
5VASW
F9340
to FM_STEREO,FV,PE,FF
2323
220u
GNDA
5,3V
7323
STD17N06
2322
100n
3337
100K
I339
12,3V / 0V
1325
T1A
19372
F9342
5VASWA
F9341
to VS,VS_SEC,HA,CNR,VPO
2328
100u
3325
220K
GNDA
1322
T500mA
19372
F9334
F9335
5VA
to I_O
5322
22u
LAL04
F9330
F9331
1324
T500mA
19372
F9332
F9333
5VD
to AIO1,AIO2,DE1,DE2,FM_STEREO
14VDC
2324
220u
GNDDC
7325
BC337-40
I330
⑥
HEHI
to AIO1
HELO
5323
100u
LAL 04
I333
2325
330n
I332
7,4V
BC327-40
7326
I331
3329
220R
7,3V
2326
220u
GNDDC
14VDC
3326
220R
I329
3327
220R
7,3V
7324
BC847B
0,4V
I328
3328
1K
5VD
3330
4K7
I327
⑤
HEST
from AIO1
GNDDC
C804
C805
C806
GNDM1
GNDM2
GNDDC
GNDA
GNDD

## Oscillograms Supply Part



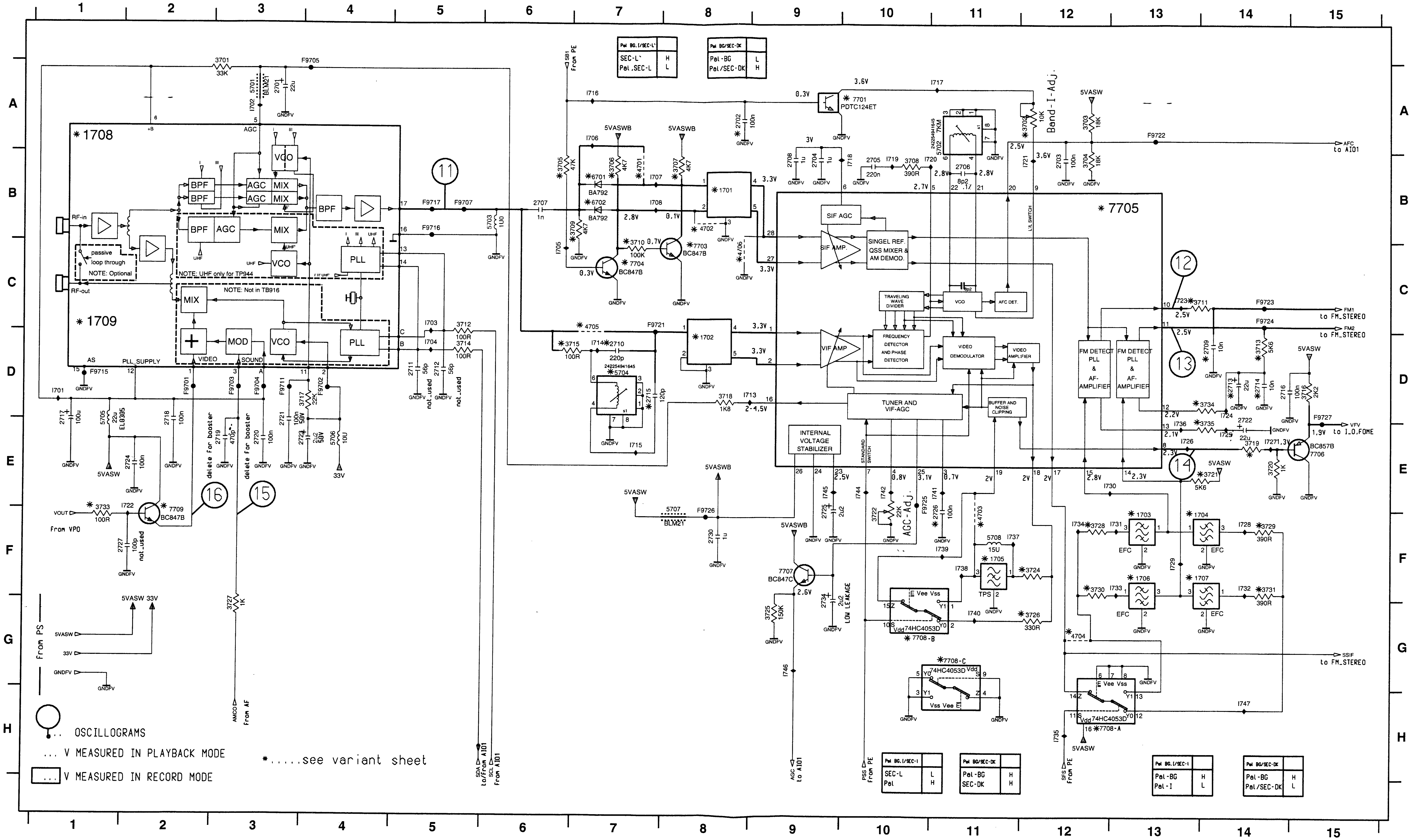
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13

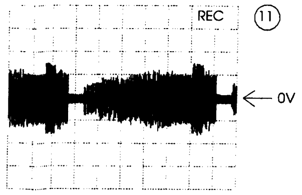


A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5

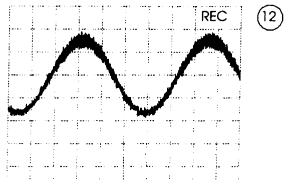
# Frontend (FV)

| | |
|---|---|
| 1701 | B8 |
| 1702 | D8 |
| 1703 | F13 |
| 1704 | F14 |
| 1705 | F11 |
| 1706 | F13 |
| 1707 | F14 |
| 1708 | A1 |
| 1709 | C1 |
| 2701 | A3 |
| 2702 | A8 |
| 2703 | B12 |
| 2704 | B9 |
| 2705 | B10 |
| 2706 | B11 |
| 2707 | B6 |
| 2708 | B9 |
| 2709 | D14 |
| 2710 | D7 |
| 2711 | D5 |
| 2712 | D5 |
| 2713 | D14 |
| 2714 | D14 |
| 2715 | D7 |
| 2716 | D14 |
| 2717 | E1 |
| 2718 | E2 |
| 2719 | E3 |
| 2720 | E3 |
| 2721 | E3 |
| 2722 | D14 |
| 2723 | E4 |
| 2724 | E2 |
| 2725 | F9 |
| 2726 | F11 |
| 2727 | F2 |
| 2730 | F8 |
| 2734 | G9 |
| 3701 | A3 |
| 3702 | A12 |
| 3703 | A12 |
| 3704 | B12 |
| 3705 | B6 |
| 3706 | B7 |
| 3707 | B8 |
| 3708 | B10 |
| 3709 | B7 |
| 3710 | C7 |
| 3711 | C13 |
| 3712 | C5 |
| 3713 | D14 |
| 3714 | D5 |
| 3715 | D6 |
| 3716 | D15 |
| 3717 | D4 |
| 3718 | D8 |
| 3719 | E14 |
| 3720 | E14 |
| 3721 | E14 |
| 3722 | E10 |
| 3724 | F12 |
| 3725 | G9 |
| 3726 | G12 |
| 3727 | G3 |
| 3728 | F12 |
| 3729 | F14 |
| 3730 | F12 |
| 3731 | F14 |
| 3733 | F1 |
| 3734 | D14 |
| 3735 | E14 |
| 4701 | B7 |
| 4702 | B8 |
| 4703 | F11 |
| 4704 | G12 |
| 4705 | C7 |
| 4706 | C8 |
| 5701 | A3 |
| 5702 | B11 |
| 5703 | B6 |
| 5704 | D7 |
| 5705 | E1 |
| 5706 | E4 |
| 5707 | E8 |
| 5708 | F11 |
| 6701 | B7 |
| 6702 | B7 |
| 7701 | A10 |
| 7703 | C8 |
| 7704 | C7 |
| 7705 | B12 |
| 7706 | E15 |
| 7707 | F9 |
| 7708 | G10 |
| 7708 | G11 |
| 7708 | H12 |
| 7709 | F2 |
| F9701 | D2 |
| F9702 | D4 |
| F9703 | D3 |
| F9704 | D3 |
| F9705 | A4 |
| F9707 | B5 |
| F9711 | D3 |
| F9715 | D1 |
| F9716 | B5 |
| F9717 | B5 |
| F9721 | C7 |
| F9722 | A13 |
| F9723 | C14 |
| F9724 | C14 |
| F9725 | E10 |
| F9726 | F8 |
| F9727 | D15 |
| I701 | D1 |
| I702 | A3 |
| I703 | C5 |
| I704 | D5 |
| I705 | C6 |
| I706 | A7 |
| I707 | B7 |
| I708 | B7 |
| I713 | D8 |
| I714 | D7 |
| I715 | E7 |
| I716 | A7 |
| I717 | A11 |
| I718 | B10 |
| I719 | B10 |
| I720 | B10 |
| I721 | B12 |
| I722 | E2 |
| I723 | C13 |
| I724 | D14 |
| I725 | E14 |
| I726 | E13 |
| I727 | E14 |
| I728 | F14 |
| I729 | F13 |
| I730 | E12 |
| I731 | F13 |
| I732 | F14 |
| I733 | F13 |
| I734 | F12 |
| I735 | H12 |
| I736 | E13 |
| I737 | F11 |
| I738 | F11 |
| I739 | F11 |
| I740 | G11 |
| I741 | E11 |
| I742 | E10 |
| I744 | E10 |
| I745 | E9 |
| I746 | G9 |
| I747 | H14 |

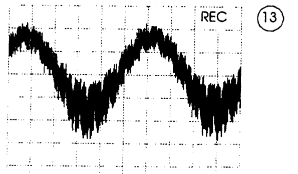

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
A B C D E F G H
*1708
*1709
RF-in
RF-out
passive loop through
NOTE: Optional
NOTE: UHF only for TP944
NOTE: Not in TB916
BPF
AGC
MIX
VCO
PLL
MOD
VIDEO
SOUND
AS
PLL_SUPPLY
AGC
+B
3701 33K
F9705
5701 BLM21
2701 22u
GNDFV
F9715
F9701
F9703
F9704
F9711
F9702
F9717
F9707
F9716
5703 1U0
3712 100R
3714 100R
2711 56p
2712 56p
not_used
2717 100u
5705 22u ELB395
2718 10n
2724 100n
5VASW
2719 470p
2720 100n
2721 100n
2722 2u2
5706 10U
33V
delete for booster
VOUT
From VPO
3733 100R
7709 BC847B
2727 100p
3727 1K
AMCO
From AF
5VASW 33V
From PS
5VASW
33V
GNDFV
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
*.....see variant sheet
SB1 From PE
2707 1n
3705 47K
3706 4K7
3707 4K7
3709 4K7
6701 BA792
6702 BA792
7704 BC847B
7703 BC847B
3710 100K
4701
4702
4705
4706
5VASWB
*1701
*1702
3715 100R
2710 220p
5704
2715
3718 1K8
2-4.5V
SDA
SCL
to/from AI01
from AI01
Pal BG,I/SEC-L'
SEC-L' H
Pal,SEC-L L
Pal BG/SEC-DK
Pal-BG L
Pal/SEC-DK H
7701 PDTC124ET
3.6V
0.3V
2702 100n
2708 1u
2704 1u
2705 220n
3708 390R
5702 7KM
2706 8p2
3702 10K
Band-I-Adj.
3703 18K
3704 18K
2703 100n
F9722
AFC to AI01
*7705
SIF AGC
SIF AMP.
SINGEL REF. QSS MIXER & AM DEMOD.
TRAVELING WAVE DIVIDER
VCO
AFC DET.
VIF AMP
FREQUENCY DETECTOR AND PHASE DETECTOR
VIDEO DEMODULATOR
VIDEO AMPLIFIER
TUNER AND VIF-AGC
BUFFER AND NOISE CLIPPING
INTERNAL VOLTAGE STABILIZER
FM DETECT PLL & AF-AMPLIFIER
L/L SWITCH
STANDARD SWITCH
3711
F9723 FM1 to FM_STEREO
F9724 FM2 to FM_STEREO
2709 10n
3713 5K6
2713 22u
2714 10n
2716 100n
3716 2K2
3734
3735
2722 22u
3719
F9727 VFV to I_O_FONE
7706 BC857B
3720 1K
3721 5K6
5707 BLM21
F9726
2730 1u
3722 22K
AGC-Adj.
F9725
2726 100n
4703
2725 2u2
7707 BC847C
3725 150K
2734 2u2
LOW LEAKAGE
5708 15U
*1705
TPS
3724
3726 330R
*1703
*1704
*1706
*1707
EFC
3728
3729 390R
3730
3731 390R
74HC4053D
*7708-B
*7708-C
*7708-A
Vee Vss Vdd
4704
SSIF to FM_STEREO
AGC to AI01
PCS From PE
SFS From PE
Pal BG,I/SEC-L
SEC-L L
Pal H
Pal BG/SEC-DK
Pal-BG H
SEC-DK H
Pal BG,I/SEC-L
Pal-BG H
Pal-I L
Pal BG/SEC-DK
Pal-BG H
Pal/SEC-DK L
11 12 13 14 15 16



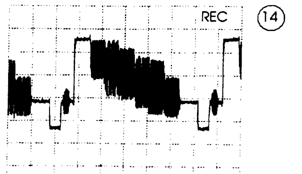
A: DC, 200mV/Div, 10us/Div
Tuner Pin 17



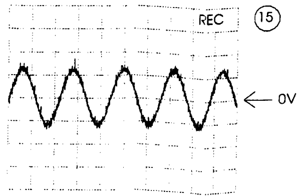
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 10



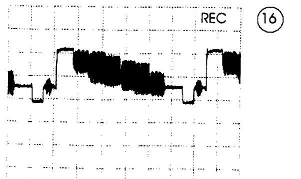
A: DC, 500mV/Div, 200us/Div
IC 7705 Pin 11



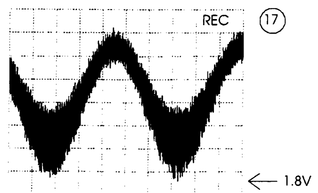
A: DC, 500mV/Div, 10us/Div
IC 7705 Pin 8



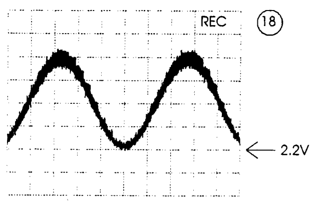
A: DC, 500mV/Div, 500us/Div
Tumod Pin 3



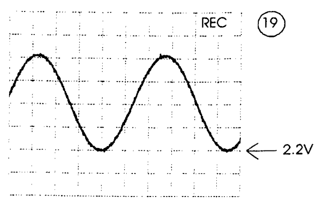
A: DC, 500mV/Div, 10us/Div
Tumod Pin 1



A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 8



A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 7

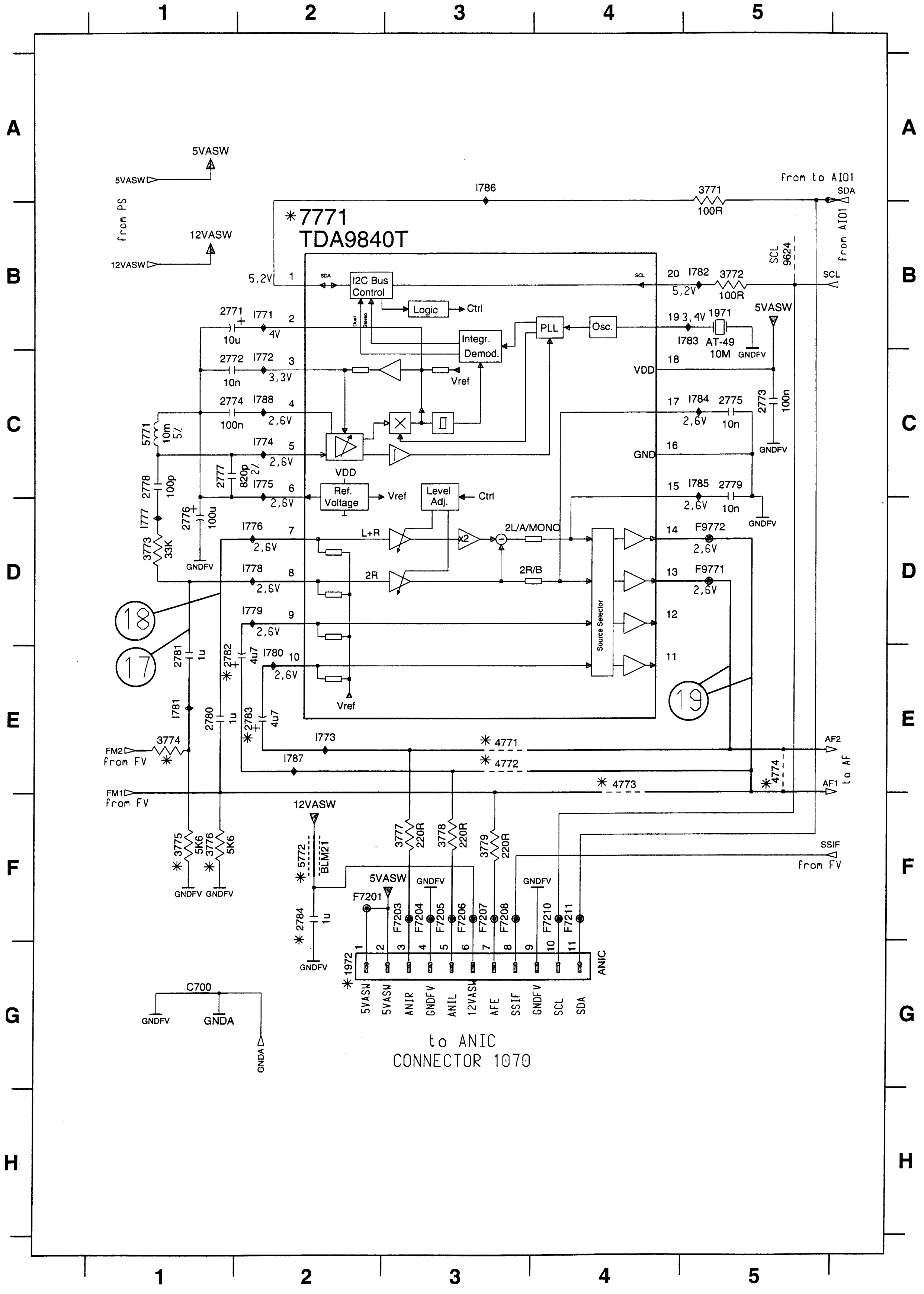


A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 13/14

## Stereo Decoder (FM_STEREO)

**Interconnections Manual Page**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |


1
2
3
4
5
A
B
C
D
E
F
G
H
5VASW
12VASW
from PS
1786
3771
100R
from to AIO1
SDA
*7771
TDA9840T
5,2V
I2C Bus Control
Logic
Ctrl
Integr. Demod.
PLL
Osc.
Vref
VDD
GND
Ref. Voltage
Level Adj.
L+R
2R
2L/A/MONO
2R/B
Source Selector
20 I782 3772
100R
19 3,4V 1971
I783 AT-49
18 10M GNDFV
17 I784 2775
2773 100n
16
15 I785 2779
14 F9772
13 F9771
12
11
SCL
9624
2771 I771
10u
2772 I772
10n
2774 I788
100n
I774
I775
I776
I778
I779
I780
2777 820p
2778 100p
2776 100u
3773 33K
5771 10m
GNDFV
2781 1u
2782 4u7
2783 4u7
2780 1u
I781
3774
FM2
from FV
FM1
from FV
I773
I787
*4771
*4772
*4773
*4774
AF2
AF1
to AF
3775 5K6
3776 5K6
5772 BLM21
2784 1u
3777 220R
3778 220R
3779 220R
F7201
F7203
F7204
F7205
F7206
F7207
F7208
F7210
F7211
SSIF
from FV
1972
ANIC
5VASW
5VASW
ANIR
GNDFV
ANIL
12VASW
AFE
SSIF
GNDFV
SCL
SDA
to ANIC
CONNECTOR 1070
C700
GNDA
17
18
19

| | |
|---|---|
| 1971 | B5 |
| 1972 | G2 |
| 2771 | B1 |
| 2772 | C1 |
| 2773 | C5 |
| 2774 | C1 |
| 2775 | C5 |
| 2776 | D1 |
| 2777 | C1 |
| 2778 | C1 |
| 2779 | C5 |
| 2780 | E1 |
| 2781 | E1 |
| 2782 | E1 |
| 2783 | E2 |
| 2784 | F2 |
| 3771 | A5 |
| 3772 | B5 |
| 3773 | D1 |
| 3774 | E1 |
| 3775 | F1 |
| 3776 | F1 |
| 3777 | F3 |
| 3778 | F3 |
| 3779 | F3 |
| 4771 | E3 |
| 4772 | E3 |
| 4773 | E4 |
| 4774 | E5 |
| 5771 | C1 |
| 5772 | F2 |
| 7771 | B2 |
| 9624 | B5 |
| C700 | G1 |
| F7201 | F2 |
| F7203 | F3 |
| F7204 | F3 |
| F7205 | F3 |
| F7206 | F3 |
| F7207 | F3 |
| F7208 | F3 |
| F7210 | F4 |
| F7211 | F4 |
| F9771 | D5 |
| F9772 | D5 |
| I771 | B2 |
| I772 | C2 |
| I773 | E2 |
| I774 | C2 |
| I775 | C2 |
| I776 | D2 |
| I777 | D1 |
| I778 | D2 |
| I779 | D2 |
| I780 | E2 |
| I781 | E1 |
| I782 | B5 |
| I783 | B5 |
| I784 | C5 |
| I785 | C5 |
| I786 | A3 |
| I787 | E2 |
| I788 | C2 |

## Variant List Frontend

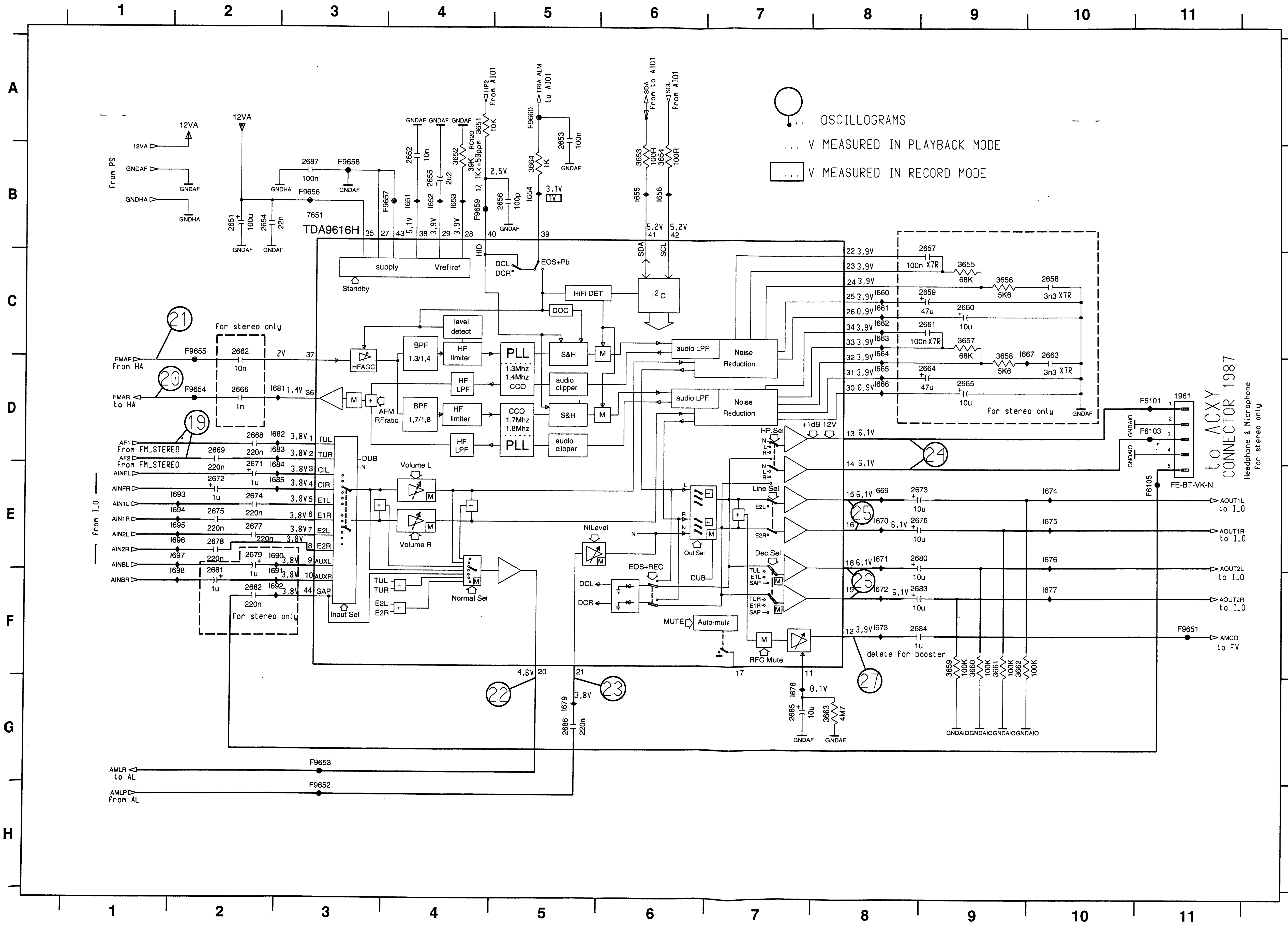
| | PAL BG | PAL BG | PAL I FULLBAND | PAL I FULLBAND | PAL, BG,I SEC L L' | PAL, BG,I SEC L L' | PAL,SEC, BG/DK | PAL,SEC, BG/DK | K1 |
|---|---|---|---|---|---|---|---|---|---|
| Pos. | FM/NICAM Stereo | MONO Interc. | NICAM Stereo | MONO Interc. | FM/NICAM Stereo | MONO | FM/NICAM Stereo | MONO | MONO |
| 1701 | G9353M | - | K9463M | - | K9456M | K9456M | K9463M | K9463M | L9360M |
| 1702 | G3956M | G1961M | K3953M | J1980M | K3953M | G1965M | G3956M | G3956M | G3956M |
| 1703 | EFC 5,5 | EFC 5,5 | EFC 6,0 | EFC 6,0 | EFC 5,5 | EFC 5,5 | EFC 5,5 | EFC 5,5 | EFC 6,5 |
| 1704 | - | - | - | - | EFC 6,0 | EFC 6,0 | EFC 6,5 | EFC 6,5 | - |
| 1705 | TPS 5,5 | TPS5,5 | TPS6,0 | TPS6,0 | TPS 5,5 | TPS 5,5 | TPS 5,5 | TPS 5,5 | TPS 6,5 |
| 1706 | EFC 5,74 | - | - | - | EFC 5,74 | - | EFC 5,74 | - | - |
| 1707 | - | - | - | - | - | - | EFC 6,25 | - | - |
| 2702 | - | - | - | - | 100n | 100n | - | - | - |
| 2707 | 1n | - | 1n | - | 1n | 1n | 1n | 1n | 1n |
| 2709 | - | 10n | 10n | 10n | - | - | - | 10n | 10n |
| 2710 | - | - | - | - | 220p | 220p | - | - | - |
| 2713 | 22u | - | - | - | 22u | - | 22u | - | - |
| 2714 | - | - | - | - | - | 10n | - | - | - |
| 2715 | - | - | - | - | 120p | 120p | - | - | - |
| 2724 | not used | - | - | - | not used | - | not used | - | - |
| 2726 | - | - | - | - | 100n | 100n | - | - | - |
| 3702 | - | - | - | - | 10k | 10k | - | - | - |
| 3705 | - | - | - | - | 47k | 47k | 47k | 47k | - |
| 3706 | - | - | - | - | 4k7 | 4k7 | 4k7 | 4k7 | - |
| 3707 | - | - | - | - | 4k7 | 4k7 | 4k7 | 4k7 | - |
| 3709 | - | - | - | - | 4k7 | 4k7 | 4k7 | 4k7 | - |
| 3710 | - | - | - | - | 100k | 100k | 100k | 100k | - |
| 3711 | 4k7 | 5k6 | 5k6 | 5k6 | 4k7 | 0E | 0E | 5k6 | 4k7 |
| 3713 | - | - | - | - | - | 5k6 | - | - | - |
| 3715 | - | - | - | - | 100E | 100E | - | - | - |
| 3719 | 1k | 1k | 820E | 820E | 820E | 820E | 820E | 820E | 1k |
| 3721 | 5k6 | - | - | - | 5k6 | - | 5k6 | - | - |
| 3724 | 330E | 330E | 330E | 330E | 270E | 270E | 330E | 330E | 330E |
| 3726 | - | - | - | - | 330E | 330E | - | - | - |
| 3728 | 470E | 470E | 470E | 470E | 390E | 390E | 390E | 390E | 470E |
| 3729 | - | - | - | - | 390E | 390E | 390E | 390E | - |
| 3730 | 470E | - | - | - | 390E | - | 390E | - | - |
| 3731 | - | - | - | - | - | - | 390E | - | - |
| 3734 | 0E | - | - | - | 0E | - | 470E | - | - |
| 3735 | 0E | 0E | 0E | 0E | 0E | 0E | 470E | 0E | 0E |
| 4701 | 0E | - | 0E | - | - | - | - | - | 0E |
| 4702 | 0E | - | 0E | - | - | - | - | - | 0E |
| 4703 | 0E | 0E | 0E | 0E | - | - | - | - | 0E |
| 4704 | 0E | 0E | 0E | 0E | - | - | - | - | 0E |
| 4705 | 0E | 0E | 0E | 0E | - | - | 0E | 0E | 0E |
| 4706 | - | 0E | - | 0E | - | - | - | - | - |
| 5704 | - | - | - | - | 41645 | 41645 | - | - | - |
| 6701 | - | - | - | - | BA 792 | BA 792 | BA 792 | BA 792 | - |
| 6702 | - | - | - | - | BA 792 | BA 792 | BA 792 | BA 792 | - |
| 7701 | - | - | - | - | PDTC124 | PDTC124 | - | - | - |
| 1708 | TP916L MKII | TP916L MKII | - | - | TP926L MKII | TP926L MKII | - | - | - |
| 1709 | TMRG 1-107A | TMRG 1-107A | TMRG 1-109A | TMRG 1-109A | TMRG 2-103A | TMRG 2-103A | TMRG 1X204A | TMRG 1X204A | TMRG 1X204A |
| 7703 | - | - | - | - | BC847B | BC847B | BC847B | BC847B | - |
| 7704 | - | - | - | - | BC847B | BC847B | BC847B | BC847B | - |
| 7705 | TDA 9813T | TDA 9813T | TDA 9813T | TDA 9813T | TDA 9814T | TDA 9812T | TDA 9813T | TDA 9813T | TDA 9813T |
| 7708 | - | - | - | - | 74HCT4053 | 74HCT4053 | 74HCT4053 | 74HCT4053 | - |

DELETE FOR BOOSTER: 2719, 2720, 3732, 3733, 7709.

## Variant List Stereo Decoder

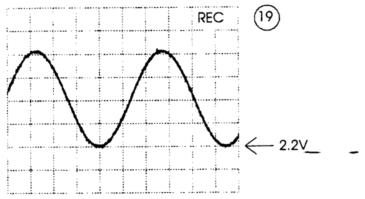
| | PAL BG | PAL BG | PAL BG | PAL I fullband | PAL I fullband | PAL, BG,I SEC L L' | PAL, BG,I SEC L L' | PAL,SEC, BG/DK | PAL,SEC, BG/DK | PAL,SEC, BG/DK | K1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pos. | FM Stereo | FM/NICAM Stereo | MONO | MONO | NICAM Stereo | FM/NICAM Stereo | MONO | FM- Stereo | FM/NICAM Stereo | MONO | NO NO |
| 2782 | - | 4u7 | - | - | - | 4u7 | - | - | 4u7 | - | – |
| 2783 | - | 4u7 | - | - | - | 4u7 | - | - | 4u7 | - | – |
| 2784 | - | 1u | - | - | 1u | 1u | - | - | 1u | - | – |
| 3774 | 4k7 | 4k7 | - | - | - | 4k7 | - | 0E | 0E | - | – |
| 3775 | 5k6 | 5k6 | - | - | - | 5k6 | - | - | - | - | – |
| 3776 | 5k6 | 5k6 | - | - | - | 5k6 | - | - | - | - | – |
| 4771 | - | - | - | - | 0E | - | - | - | - | - | – |
| 4772 | - | - | - | - | 0E | - | - | - | - | - | – |
| 4773 | - | - | 0E | 0E | - | - | 0E | - | - | 0E | 0 E |
| 5772 | - | BML21 | - | - | BML21 | BML21 | - | - | BML21 | - | – |
| 7771 | TDA 9840 T | TDA 9840 T | - | - | - | TDA 9840 T | - | TDA 9840 T | TDA 9840 T | - | – |
| 1972 | - | ANIC (QNIC) | - | - | ANIC (QNIC) | ANIC (QNIC) | - | - | ANIC (QNIC) | - | – |

# FM Audio (AF)

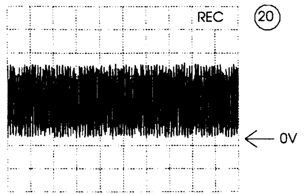

OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
From PS
12VA
GNDAF
GNDHA
7651
TDA9616H
supply
Vref Iref
Standby
HIFAGC
BPF 1,3/1,4
BPF 1,7/1,8
HF limiter
HF LPF
level detect
PLL
1.3Mhz 1.4Mhz CCO
CCO 1.7Mhz 1.8Mhz
S&H
audio clipper
HiFi DET
DOC
I²C
DCL
DCR
EOS+Pb
audio LPF
Noise Reduction
AFM RFratio
DUB
Input Sel
Volume L
Volume R
Normal Sel
NlLevel
EOS+REC
Out Sel
Line Sel
Dec.Sel
HP.Sel
+1dB 12V
MUTE
Auto-mute
RFC Mute
For stereo only
FMAP From HA
FMAR to HA
AF1 From FM_STEREO
AF2 From FM_STEREO
AINFL
AINFR
AIN1L
AIN1R
AIN2L
AIN2R
AINBL
AINBR
From I_O
AMLR to AL
AMLP From AL
HP2 From AI01
TRIA_ALM to AI01
SDA From to AI01
SCL From AI01
AOUT1L to I_O
AOUT1R to I_O
AOUT2L to I_O
AOUT2R to I_O
AMCO to FV
delete for booster
to ACXY CONNECTOR 1987
Headphone & Microphone For stereo only
FE-BT-VK-N
1961
F6101
F6103
F6105
F9651
F9652
F9653
F9654
F9655
F9656
F9657
F9658
F9659
F9660
GNDAIO
19
20
21
22
23
24
25
26
27
1 2 3 4 5 6 7 8 9 10 11
A B C D E F G H

|  |  |
|---|---|
| 1961 | D11 |
| 2651 | B2 |
| 2652 | B4 |
| 2653 | A5 |
| 2654 | B2 |
| 2655 | B4 |
| 2656 | B5 |
| 2657 | B9 |
| 2658 | C10 |
| 2659 | C9 |
| 2660 | C9 |
| 2661 | C9 |
| 2662 | C2 |
| 2663 | C10 |
| 2664 | D9 |
| 2665 | D9 |
| 2666 | D2 |
| 2668 | D2 |
| 2669 | D2 |
| 2671 | E2 |
| 2672 | E2 |
| 2673 | E8 |
| 2674 | E2 |
| 2675 | E2 |
| 2676 | E8 |
| 2677 | E2 |
| 2678 | E2 |
| 2679 | E2 |
| 2680 | E8 |
| 2681 | F2 |
| 2682 | F2 |
| 2683 | F8 |
| 2684 | F8 |
| 2685 | G7 |
| 2686 | G5 |
| 2687 | B3 |
| 3651 | A4 |
| 3652 | B4 |
| 3653 | B6 |
| 3654 | B6 |
| 3655 | C9 |
| 3656 | C9 |
| 3657 | C9 |
| 3658 | C9 |
| 3659 | F9 |
| 3660 | F9 |
| 3661 | F9 |
| 3662 | F9 |
| 3663 | G8 |
| 3664 | B5 |
| 7651 | B3 |
| F6101 | D11 |
| F6103 | D11 |
| F6105 | E11 |
| F9651 | F11 |
| F9652 | H3 |
| F9653 | G3 |
| F9654 | D2 |
| F9655 | C2 |
| F9656 | B3 |
| F9657 | B4 |
| F9658 | B3 |
| F9659 | B4 |
| F9660 | A5 |
| I651 | B4 |
| I652 | B4 |
| I653 | B4 |
| I654 | B5 |
| I655 | B6 |
| I656 | B6 |
| I660 | C8 |
| I661 | C8 |
| I662 | C8 |
| I663 | C8 |
| I664 | C8 |
| I665 | D8 |
| I666 | D8 |
| I667 | C9 |
| I669 | E8 |
| I670 | E8 |
| I671 | E8 |
| I672 | F8 |
| I673 | F8 |
| I674 | E10 |
| I675 | E10 |
| I676 | E10 |
| I677 | F10 |
| I678 | G7 |
| I679 | G5 |
| I681 | D2 |
| I682 | D2 |
| I683 | D2 |
| I684 | E2 |
| I685 | E2 |
| I690 | E2 |
| I691 | F2 |
| I692 | F2 |
| I693 | E2 |
| I694 | E2 |
| I695 | E2 |
| I696 | E2 |
| I697 | E2 |
| I698 | F2 |

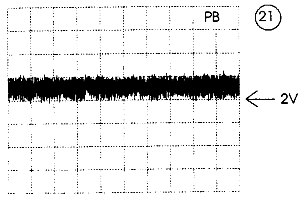
## Oscillograms FM Audio, Erase Oscillator



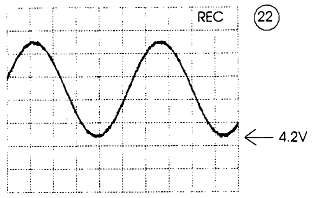
A: AC, 200mV/Div, 200us/Div
IC 7771 Pin 13/14



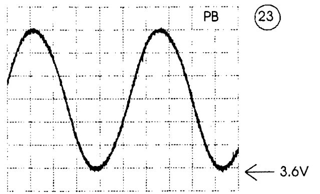
A: DC, 200mV/Div, 5ms/Div
FMAR



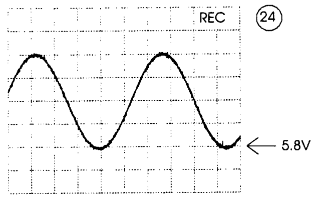
A: AC, 200mV/Div, 500us/Div
FMAP



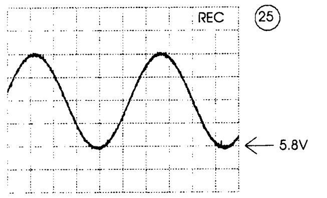
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 20



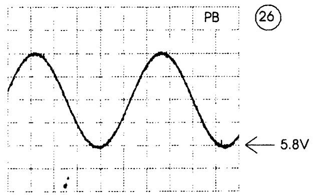
A: AC, 100mV/Div, 200us/Div
IC 7651 Pin 21



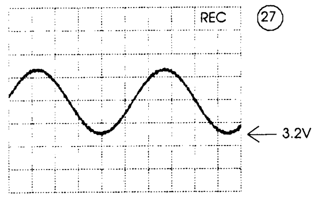
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 13/14



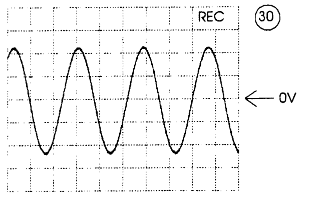
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 15/16



A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 18/19



A: AC, 500mV/Div, 200us/Div
IC 7651 Pin 12



A: DC, 10 V/Div, 5us/Div
Connector 1964 Pin 1

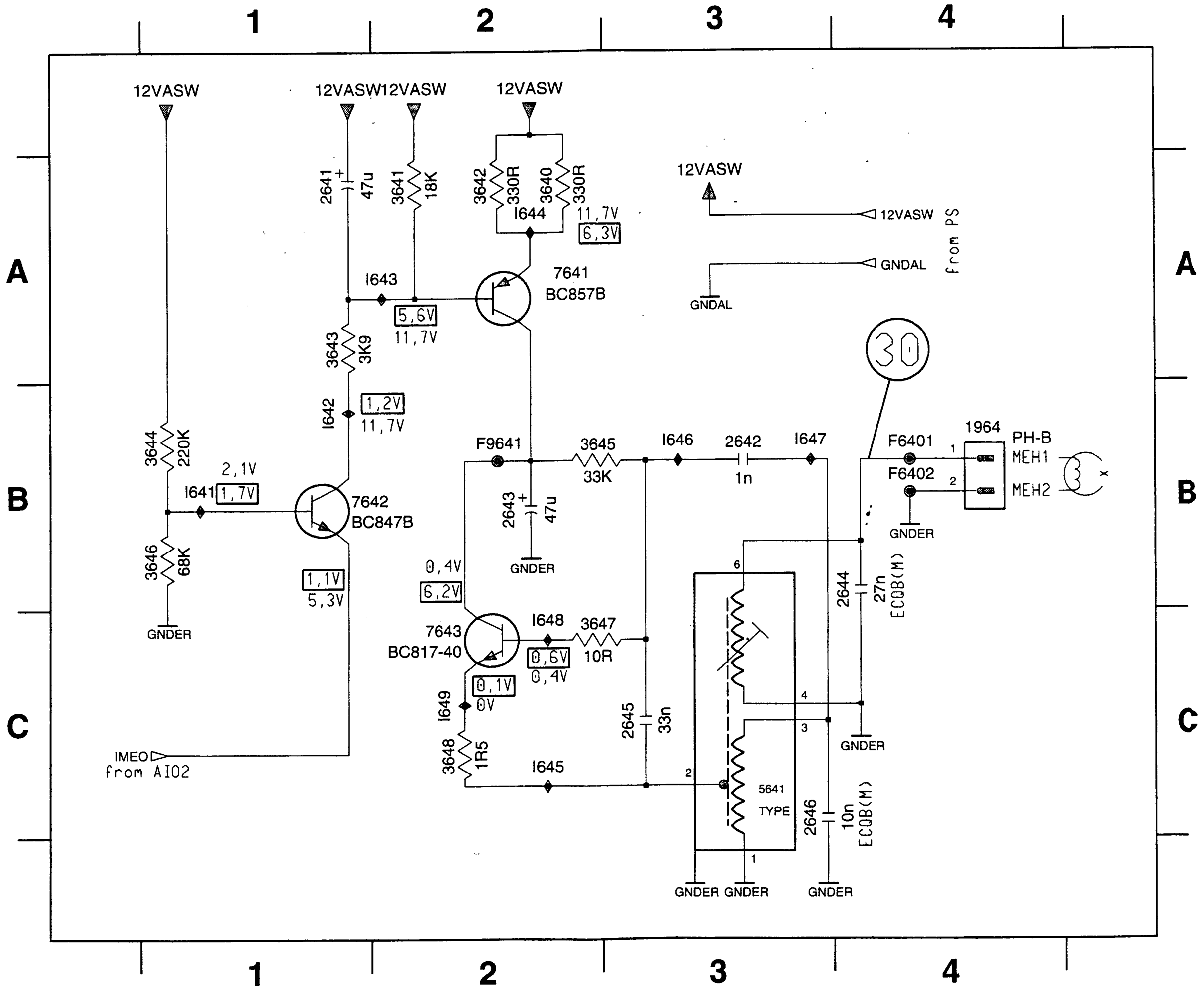
**Interconnections Manual Page**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 | |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 | |

---

## Main Erase Oscillator (ER)

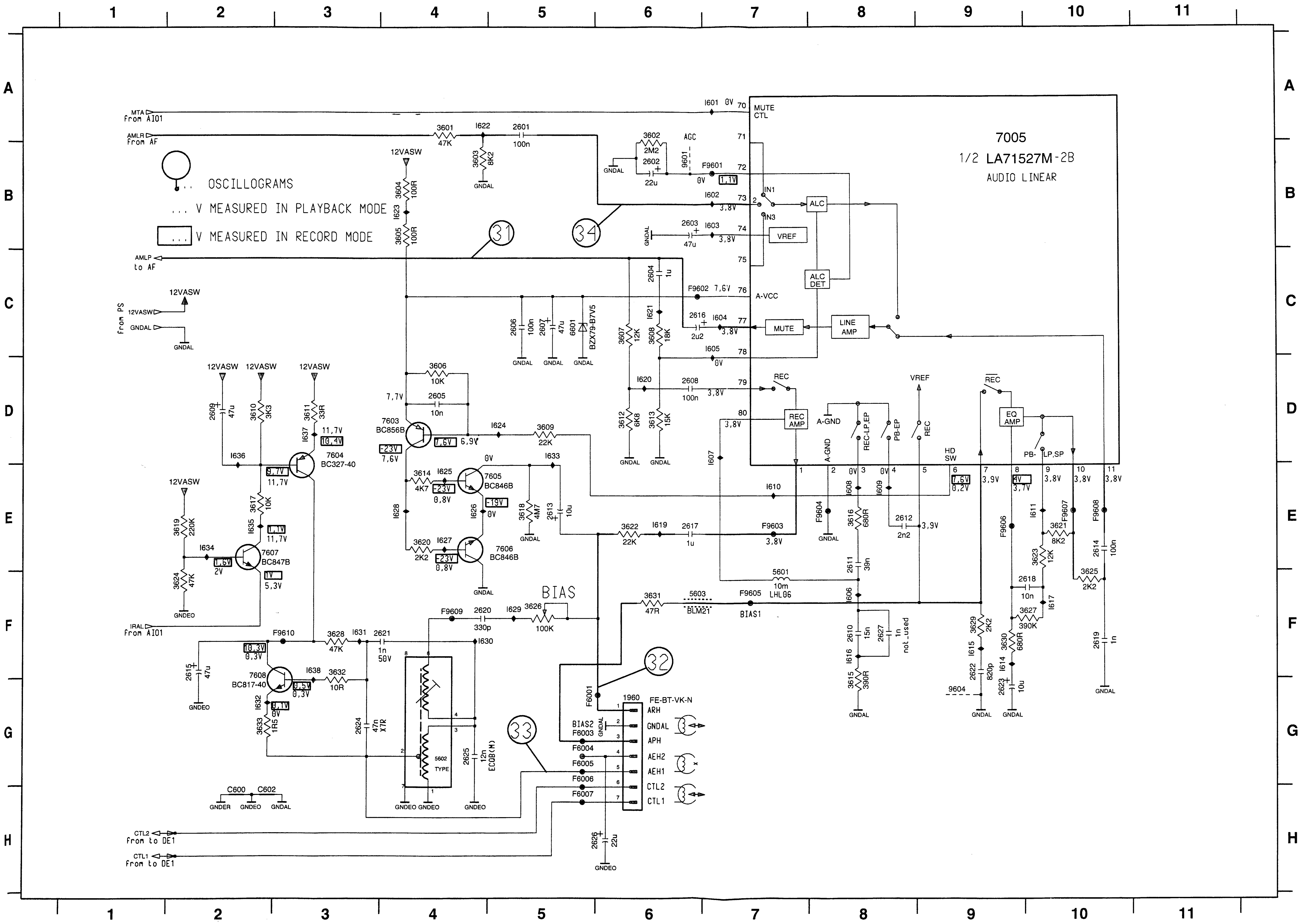
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1964 B4 | 2643 B2 | 2646 C3 | 3642 A2 | 3645 B2 | 3648 C2 | 7642 B1 | F6402 B4 | I642 B1 | I645 C2 | I648 C2 |
| 2641 A1 | 2644 B4 | 3640 A2 | 3643 A1 | 3646 B1 | 5641 C3 | 7643 C2 | F9641 B2 | I643 A2 | I646 B3 | I649 C2 |
| 2642 B3 | 2645 C3 | 3641 A2 | 3644 B1 | 3647 C2 | 7641 A2 | F6401 B4 | I641 B1 | I644 A2 | I647 B3 | |


1
2
3
4
A
B
C
12VASW
12VASW12VASW
12VASW
2641
47u
3641
18K
3642
330R
3640
330R
I644
11,7V
6,3V
12VASW
12VASW
GNDAL
from PS
GNDAL
I643
5,6V
11,7V
7641
BC857B
3643
3K9
30
I642
1,2V
11,7V
3644
220K
2,1V
I641
1,7V
7642
BC847B
3646
68K
GNDER
1,1V
5,3V
F9641
3645
33K
I646
2642
1n
I647
F6401
F6402
1964
PH-B
MEH1
MEH2
2643
47u
GNDER
0,4V
6,2V
7643
BC817-40
I648
3647
10R
0,6V
0,4V
0,1V
0V
I649
3648
1R5
I645
2645
33n
5641
TYPE
2644
27n
ECOB(M)
2646
10n
ECOB(M)
GNDER
IMEO
from AI02

## Audio Linear (AL)

**Interconnections Manual Page**

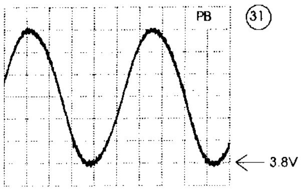
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |



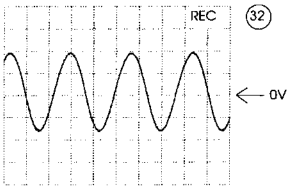
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
7005
1/2 LA71527M-2B
AUDIO LINEAR
MTA From AI01
AMLR From AF
AMLP to AF
12VASW
GNDAL
From PS
IRAL From AI01
CTL2 From to DE1
CTL1 From to DE1
MUTE CTL
IN1
IN3
ALC
VREF
ALC DET
A-VCC
MUTE
LINE AMP
REC
REC AMP
A-GND
REC-LP,EP
PB-EP
HD SW
EQ AMP
PB-
LP,SP
AGC
BIAS
BIAS1
BIAS2
FE-BT-VK-N
ARH
APH
AEH2
AEH1
CTL2
CTL1
5602 TYPE
BC856B
BC327-40
BC846B
BC847B
BC817-40
BZX79-B7V5
BLM21
LHL06
not_used
ECOB(M)
GNDEO
GNDER
C600
C602
31
32
33
34

| | |
|---|---|
| 1960 | G6 |
| 2601 | A5 |
| 2602 | B6 |
| 2603 | B6 |
| 2604 | C6 |
| 2605 | D4 |
| 2606 | C5 |
| 2607 | C5 |
| 2608 | D6 |
| 2609 | D2 |
| 2610 | F8 |
| 2611 | E8 |
| 2612 | E8 |
| 2613 | E5 |
| 2614 | E10 |
| 2615 | F2 |
| 2616 | C6 |
| 2617 | E6 |
| 2618 | F10 |
| 2619 | F10 |
| 2620 | F4 |
| 2621 | F4 |
| 2622 | F9 |
| 2623 | G9 |
| 2624 | G3 |
| 2625 | G4 |
| 2626 | H6 |
| 2627 | F8 |
| 3601 | A4 |
| 3602 | A6 |
| 3603 | B4 |
| 3604 | B4 |
| 3605 | B4 |
| 3606 | D4 |
| 3607 | C6 |
| 3608 | C6 |
| 3609 | D5 |
| 3610 | D2 |
| 3611 | D3 |
| 3612 | D6 |
| 3613 | D6 |
| 3614 | E4 |
| 3615 | G8 |
| 3616 | E8 |
| 3617 | E2 |
| 3618 | E5 |
| 3619 | E2 |
| 3620 | E4 |
| 3621 | E10 |
| 3622 | E6 |
| 3623 | E10 |
| 3624 | F2 |
| 3625 | F10 |
| 3626 | F5 |
| 3627 | F10 |
| 3628 | F3 |
| 3629 | F9 |
| 3630 | F9 |
| 3631 | F6 |
| 3632 | F3 |
| 3633 | G2 |
| 5601 | F7 |
| 5602 | G4 |
| 5603 | F6 |
| 6601 | C5 |
| 7005 | B9 |
| 7603 | D4 |
| 7604 | D3 |
| 7605 | E4 |
| 7606 | E5 |
| 7607 | E2 |
| 7608 | F2 |
| 9601 | B6 |
| 9604 | G9 |
| C600 | H2 |
| C602 | H2 |
| F6001 | G5 |
| F6003 | G5 |
| F6004 | G5 |
| F6005 | G5 |
| F6006 | G5 |
| F6007 | H5 |
| F9601 | B7 |
| F9602 | C6 |
| F9603 | E7 |
| F9604 | E8 |
| F9605 | F7 |
| F9606 | E9 |
| F9607 | E10 |
| F9608 | E10 |
| F9609 | F4 |
| F9610 | F3 |
| 1601 | A7 |
| 1602 | B7 |
| 1603 | B7 |
| 1604 | C7 |
| 1605 | C7 |
| 1606 | F8 |
| 1607 | D7 |
| 1608 | E8 |
| 1609 | E8 |
| 1610 | E7 |
| 1611 | E10 |
| 1614 | F9 |
| 1615 | F9 |
| 1616 | F8 |
| 1617 | F10 |
| 1619 | E6 |
| 1620 | D6 |
| 1621 | C6 |
| 1622 | A4 |
| 1623 | B4 |
| 1624 | D5 |
| 1625 | E4 |
| 1626 | E4 |
| 1627 | E4 |
| 1628 | E4 |
| 1629 | F5 |
| 1630 | F4 |
| 1631 | F3 |
| 1632 | G2 |
| 1633 | D5 |
| 1634 | E2 |
| 1635 | E2 |
| 1636 | D2 |
| 1637 | D3 |
| 1638 | F3 |

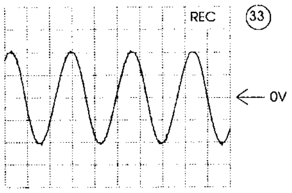
# Oscillograms Audio Linear



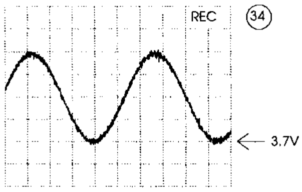
A: AC, 100mV/Div, 200us/Div
IC 7005 Pin 77



A: DC, 20 V/Div, 5us/Div
Connector 1960 Pin 1

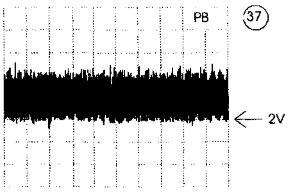


A: DC, 5 V/Div, 5us/Div
Connector 1960 Pin 5



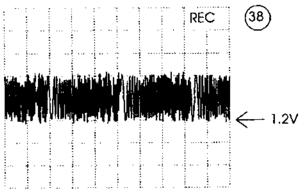
A: AC, 50mV/Div, 200us/Div
IC 7005 Pin 73

# Oscillograms Video Signal Processing



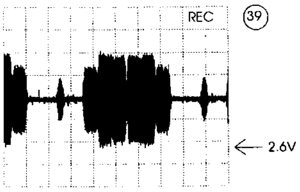
㊲

A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



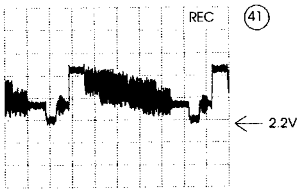
㊳

A: AC, 200mV/Div, 20us/Div
FMRV



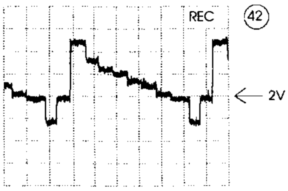
㊴

A: AC, 100mV/Div, 10us/Div
CPRV



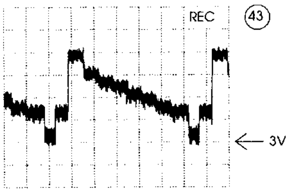
㊶

A: AC, 500mV/Div, 10us/Div
IC 7005 Pin 35



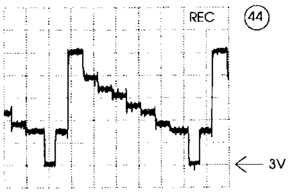
㊷

A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 42



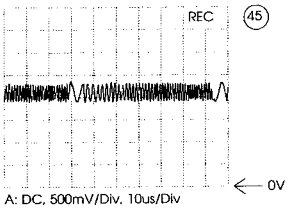
㊸

A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 40



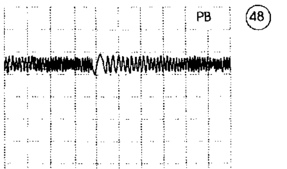
㊹

A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 26



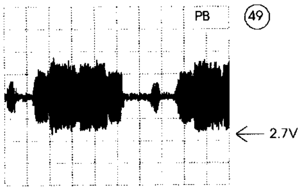
㊺

A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 18



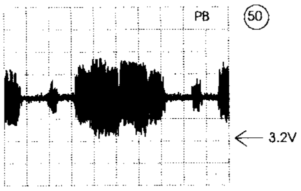
㊽

A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 20



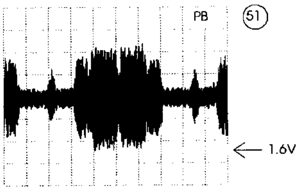
㊾

A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 48/50



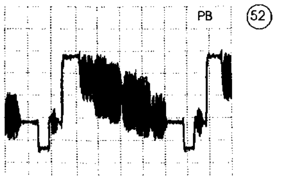
㊿

A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 52



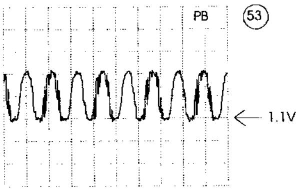
(51)

A: AC, 100mV/Div, 10us/Div
IC 7005 Pin 45



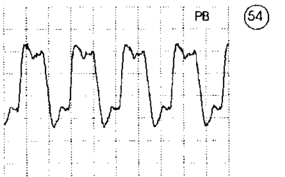
(52)

A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35



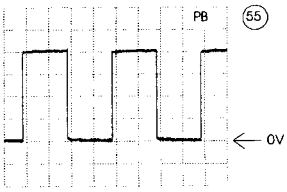
(53)

A: AC, 200mV/Div, 100ns/Div
IC 7005 Pin 58



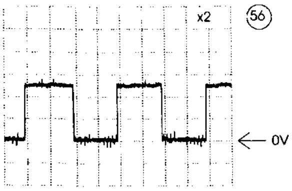
(54)

A: DC, 200mV/Div, 100ns/Div
IC 7003 Pin 10



(55)

A: DC, 200mV/Div, 10ms/Div
IC 7005 Pin 66



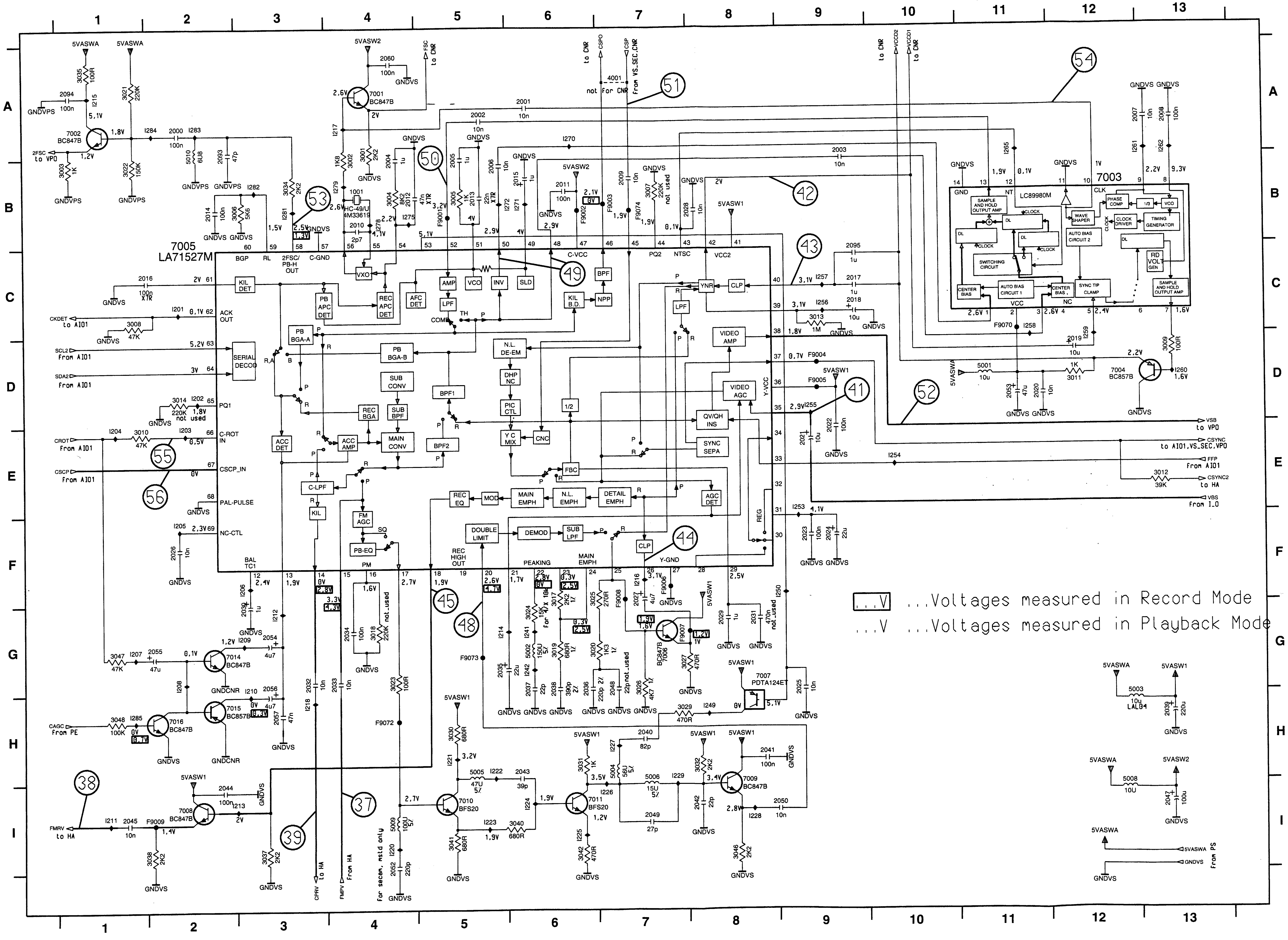
(56)

A: DC, 500mV/Div, 10ms/Div
IC 7005 Pin 67

## Video Signal Processing (VS)

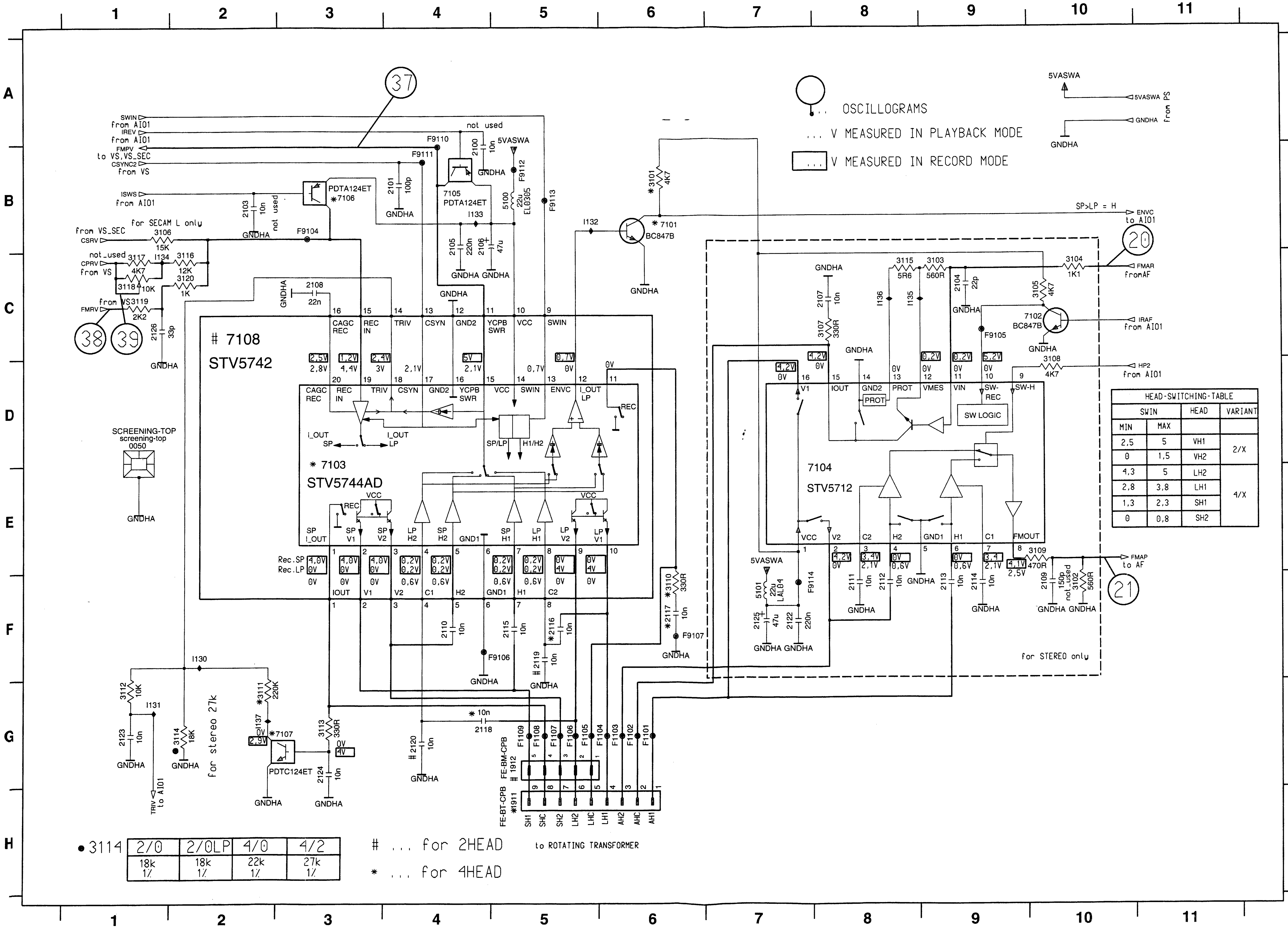
**Interconnections Manual Page**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |


7005
LA71527M
7003
LC89980M
7001 BC847B
7002 BC847B
7004 BC857B
7006 BC847B
7007 PDTA124ET
7008 BC847B
7009 BC847B
7010 BFS20
7011 BFS20
7014 BC847B
7015 BC857B
7016 BC847B
1001 HC-49/U 4M33619
5VASWA
5VASW1
5VASW2
GNDVS
GNDVPS
GNDCNR
2FSC to VPO
CKDET to AIO1
SCL2 From AIO1
SDA2 From AIO1
CROT From AIO1
CSCP From AIO1
CAGC From PE
FMRV to HA
CPRV to HA
FMPV From HA
VSB to VPO
CSYNC to AIO1,VS_SEC,VPO
FFP From AIO1
CSYNC2 to HA
VBS From I_O
5VASWA From PS
GNDVS From PS
to CNR
CSPO
CSP From VS_SEC,CNR
VCCD2 to CNR
VCCD1 to CNR
FSC to CNR
not for CNR
not used
For secam, mstd only
KIL DET
SERIAL DECOD
PB APC DET
REC APC DET
PB BGA-A
PB BGA-B
AFC DET
AMP
VCO
INV
SLD
LPF
VXO
KIL B.D.
NPP
BPF
YNR
CLP
VIDEO AMP
VIDEO AGC
QV/QH INS
SYNC SEPA
N.L. DE-EM
DHP NC
PIC CTL
Y C MIX
CNC
FBC
1/2
SUB CONV
SUB BPF
REC BGA
MAIN CONV
ACC AMP
ACC DET
BPF1
BPF2
C-LPF
KIL
FM AGC
PB-EQ
REC EQ
MOD
MAIN EMPH
N.L. EMPH
DETAIL EMPH
AGC DET
DOUBLE LIMIT
DEMOD
SUB LPF
REG
BGP
RL
2FSC/PB-H OUT
C-GND
C-VCC
PQ2
NTSC
VCC2
ACK OUT
PQ1
C-ROT IN
CSCP_IN
PAL-PULSE
NC-CTL
BAL TC1
PM
REC HIGH OUT
PEAKING
MAIN EMPH
Y-GND
Y-VCC
SAMPLE AND HOLD OUTPUT AMP
WAVE SHAPER
PHASE COMP
VCO
CLOCK DRIVER
TIMING GENERATOR
AUTO BIAS CIRCUIT 2
SWITCHING CIRCUIT
CENTER BIAS
AUTO BIAS CIRCUIT 1
SYNC TIP CLAMP
RD VOLT GEN
SAMPLE AND HOLD OUTPUT AMP
CLOCK
CLK
GND
VCC
NC
(37)
(38)
(39)
(41)
(42)
(43)
(44)
(45)
(48)
(49)
(50)
(51)
(52)
(53)
(54)
(55)
(56)
...Voltages measured in Record Mode
...V ...Voltages measured in Playback Mode
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I

1001 B4
2000 A2
2001 A6
2002 A5
2003 A9
2004 B4
2005 B5
2006 B5
2007 A13
2008 A13
2009 B7
2010 B4
2011 B6
2012 B4
2013 B5
2014 B2
2015 B6
2016 C1
2017 C9
2018 C9
2019 D12
2020 D11
2021 E9
2022 E9
2023 F9
2024 F9
2025 G9
2026 F2
2027 F7
2028 B8
2029 G8
2030 G3
2031 G8
2032 G3
2033 G4
2034 G4
2035 G5
2036 G6
2037 G6
2038 G6
2039 H13
2040 H7
2041 H8
2042 I8
2043 H6
2044 I2
2045 I1
2047 I13
2048 G7
2049 I7
2050 I8
2052 I4
2053 D11
2054 G3
2055 G2
2056 G3
2057 H3
2060 A4
2093 A2
2094 A1
2095 C9
3001 A4
3002 B4
3003 B1
3004 B4
3005 B5
3006 B3
3007 B7
3008 C1
3009 D13
3010 E1
3011 D12
3012 E13
3013 C9
3014 D2
3017 F6
3018 G4
3019 G6
3020 G6
3021 A1
3022 B1
3023 G4
3024 G6
3025 F6
3026 G7
3027 G7
3029 H7
3030 H5
3031 H6
3032 H8
3034 B3
3035 A1
3037 I3
3038 I2
3040 I6
3041 I5
3042 I6
3046 I8
3047 G1
3048 H1
4001 A7
5001 D11
5002 G6
5003 H12
5004 H7
5005 H5
5006 H7
5008 I12
5009 I4
5010 A2
7001 A4
7002 A1
7003 B12
7004 D12
7005 B2
7006 G7
7007 G8
7008 I2
7009 I8
7010 I5
7011 I6
7014 G2
7015 H2
7016 H2
F9001 B5
F9002 B6
F9003 B7
F9004 D9
F9005 D9
F9006 F7
F9007 G7
F9008 F7
F9009 I2
F9070 C11
F9072 H4
F9073 G5
F9074 B7
I201 C2
I202 D2
I203 E2
I204 E1
I205 F2
I206 F3
I207 G1
I208 G2
I209 G3
I210 G3
I211 I1
I212 G3
I213 I2
I214 G5
I215 A1
I216 F7
I217 A4
I218 H3
I220 I4
I221 H5
I222 H5
I223 I5
I224 I6
I225 I6
I226 I7
I227 H7
I228 I8
I229 H7
I241 G6
I242 G6
I249 H8
I250 F8
I253 E9
I254 E10
I255 D9
I256 C9
I257 C9
I258 C11
I259 D12
I260 D13
I261 A12
I262 A13
I265 A11
I270 A6
I271 B6
I272 B6
I275 B4
I278 B4
I279 B4
I281 B3
I282 B3
I283 A2
I284 A2
I285 H1

## Head Amplifier (HA)


37
38
39
20
21
SWIN from AI01
IREV from AI01
FMPV to VS,VS_SEC
CSYNC2 from VS
ISWS from AI01
from VS_SEC CSRV
for SECAM L only
not_used CPRV from VS
from VS FMRV
not used
5VASWA
GNDHA
PDTA124ET *7106
7105 PDTA124ET
F9110
F9111
F9104
F9112
F9113
I132
I133
I134
*7101 BC847B
# 7108 STV5742
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
SWIN
ENVC
I_OUT LP
* 7103 STV5744AD
I_OUT SP
I_OUT LP
SP/LP
H1/H2
REC
VCC
SP I_OUT
SP V1
SP V2
LP H2
SP H2
GND1
SP H1
LP H1
LP V2
LP V1
Rec.SP Rec.LP
IOUT V1 V2 C1 H2 GND1 H1 C2
SCREENING-TOP screening-top 0050
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
5VASWA from PS
SP>LP = H
ENVC to AI01
FMAR fromAF
IRAF from AI01
HP2 from AI01
7102 BC847B
F9105
7104 STV5712
IOUT GND2 PROT VMES VIN SW-REC SW-H
SW LOGIC
VCC V2 C2 H2 GND1 H1 C1 FMOUT
FMAP to AF
5VASWA
F9114
for STEREO only
I130
I131
I137
*7107 PDTC124ET
TRIV to AI01
for stereo 27k
F9106
F9107
FE-BM-CPB #1912
FE-BT-CPB *1911
F1109 F1108 F1107 F1106 F1105 F1104 F1103 F1102 F1101
SH1 SHC SH2 LH2 LHC LH1 AH2 AHC AH1
to ROTATING TRANSFORMER
A B C D E F G H
1 2 3 4 5 6 7 8 9 10 11

| HEAD-SWITCHING-TABLE | | | |
|---|---|---|---|
| SWIN | | HEAD | VARIANT |
| MIN | MAX | | |
| 2,5 | 5 | VH1 | 2/X |
| 0 | 1,5 | VH2 | |
| 4,3 | 5 | LH2 | 4/X |
| 2,8 | 3,8 | LH1 | |
| 1,3 | 2,3 | SH1 | |
| 0 | 0,8 | SH2 | |

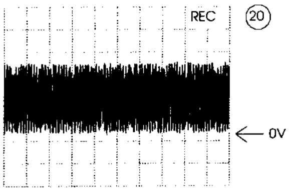
| •3114 | 2/0 | 2/0LP | 4/0 | 4/2 |
|---|---|---|---|---|
| | 18k<br>1% | 18k<br>1% | 22k<br>1% | 27k<br>1% |

# ... for 2HEAD

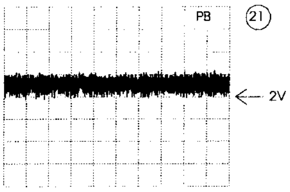
* ... for 4HEAD

| | |
|---|---|
| 0050 | D1 |
| 1911 | H5 |
| 1912 | G5 |
| 2100 | B4 |
| 2101 | B4 |
| 2103 | B2 |
| 2104 | C9 |
| 2105 | B4 |
| 2106 | B4 |
| 2107 | C8 |
| 2108 | C3 |
| 2109 | F10 |
| 2110 | F4 |
| 2111 | F8 |
| 2112 | F8 |
| 2113 | F9 |
| 2114 | F9 |
| 2115 | F5 |
| 2116 | F5 |
| 2117 | F6 |
| 2118 | G4 |
| 2119 | F5 |
| 2120 | G4 |
| 2122 | F7 |
| 2123 | G1 |
| 2124 | G3 |
| 2125 | F7 |
| 2126 | C1 |
| 3101 | B6 |
| 3102 | F10 |
| 3103 | C9 |
| 3104 | C10 |
| 3105 | C10 |
| 3106 | B1 |
| 3107 | C8 |
| 3108 | D10 |
| 3109 | E10 |
| 3110 | F6 |
| 3111 | G2 |
| 3112 | G1 |
| 3113 | G3 |
| 3114 | G2 |
| 3115 | C8 |
| 3116 | C2 |
| 3117 | C1 |
| 3118 | C1 |
| 3119 | C1 |
| 3120 | C2 |
| 5100 | B5 |
| 5101 | F7 |
| 7101 | B6 |
| 7102 | C10 |
| 7103 | E3 |
| 7104 | E7 |
| 7105 | B4 |
| 7106 | B3 |
| 7107 | G3 |
| 7108 | C2 |
| F1101 | G6 |
| F1102 | G6 |
| F1103 | G6 |
| F1104 | G6 |
| F1105 | G5 |
| F1106 | G5 |
| F1107 | G5 |
| F1108 | G5 |
| F1109 | G5 |
| F9104 | B3 |
| F9105 | C9 |
| F9106 | F5 |
| F9107 | F6 |
| F9110 | A4 |
| F9111 | B4 |
| F9112 | B5 |
| F9113 | B5 |
| F9114 | F7 |
| I130 | F2 |
| I131 | G1 |
| I132 | B5 |
| I133 | B4 |
| I134 | C1 |
| I135 | C8 |
| I136 | C8 |
| I137 | G2 |

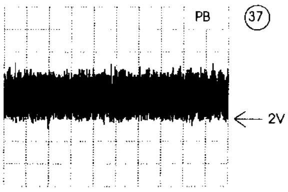
# Oscillograms Head Amplifier



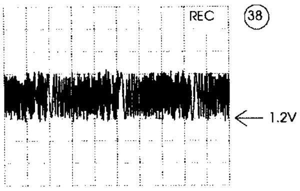
A: DC, 200mV/Div, 5ms/Div
FMAR



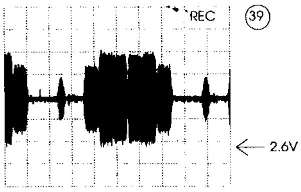
A: AC, 200mV/Div, 500us/Div
FMAP



A: AC, 200mV/Div, 20us/Div
IC 7103 Pin 15



A: AC, 200mV/Div, 20us/Div
FMRV

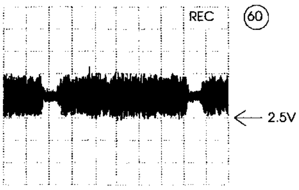


A: AC, 100mV/Div, 10us/Div
CPRV

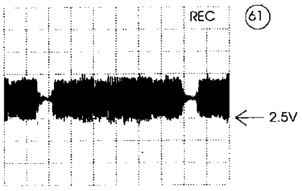
**Interconnections Manual Page**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |

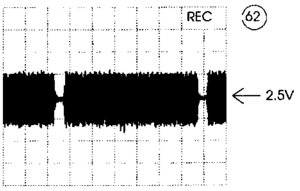
# Oscillograms SECAM L Chroma Processing



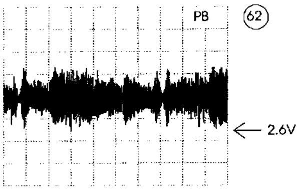
A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 29



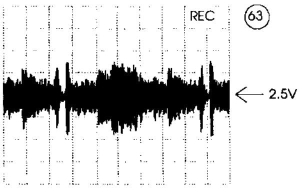
A: AC, 500mV/Div, 10us/Div
IC 7066 Pin 24



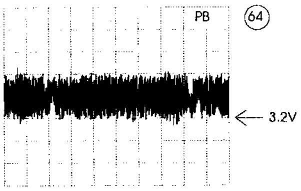
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 19



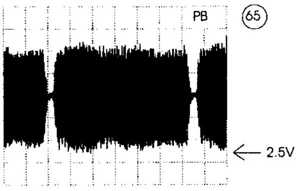
A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 19



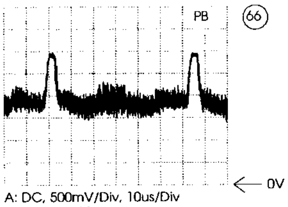
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 17



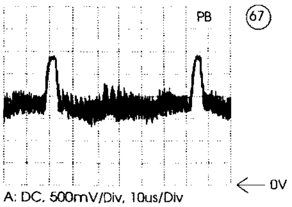
A: AC, 200mV/Div, 10us/Div
IC 7066 Pin 23



A: AC, 100mV/Div, 10us/Div
IC 7066 Pin 8



A: DC, 500mV/Div, 10us/Div
IC 7066 Pin 32

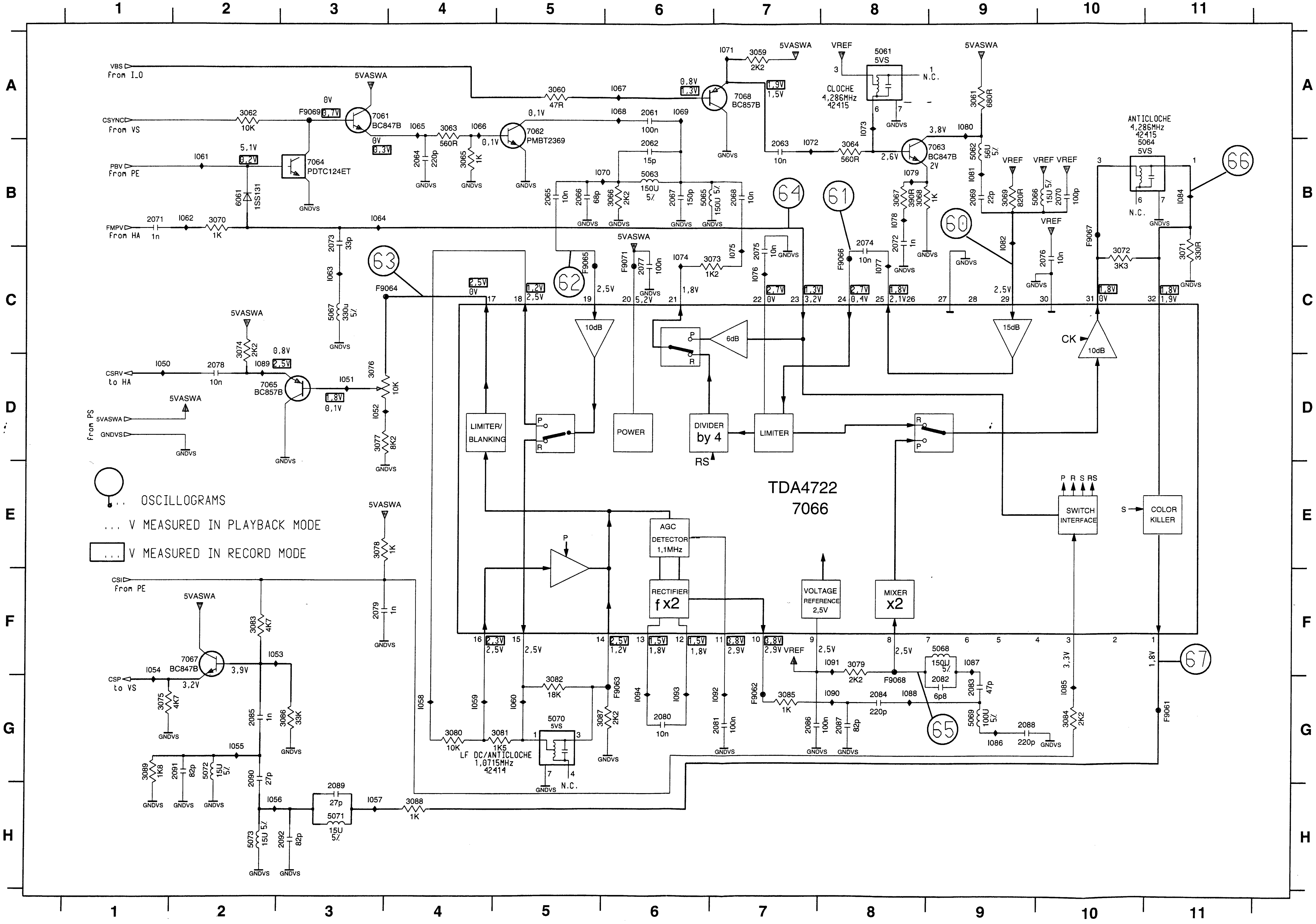


A: DC, 500mV/Div, 10us/Div
IC 7066 Pin 1

**Interconnections Manual Page**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |

# Chroma Processing SECAM L (VS_SECAM)

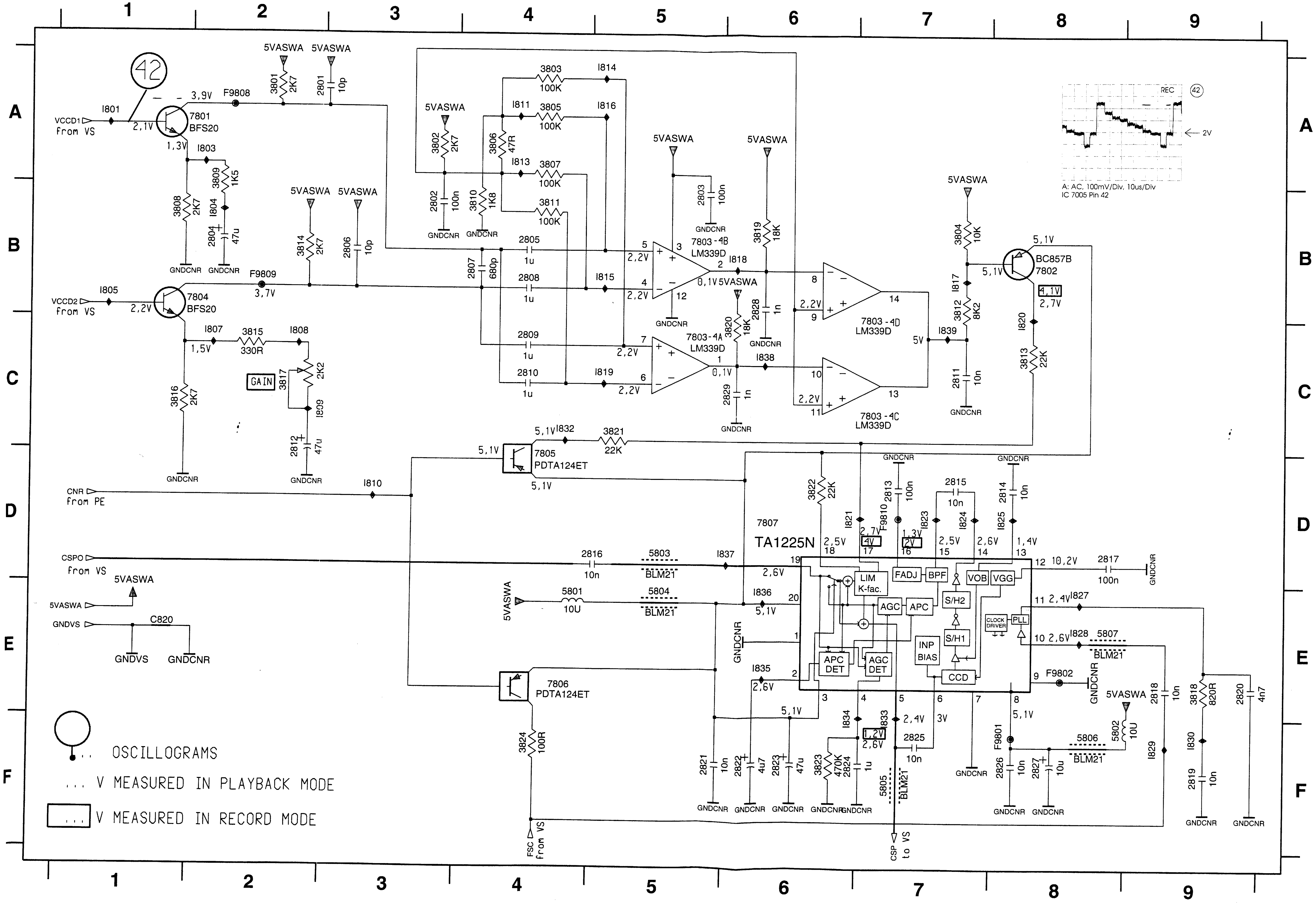

TDA4722
7066
VBS from I_O
CSYNC from VS
PBV from PE
FMPV from HA
CSRV to HA
5VASWA
GNDVS
from PS
CSI from PE
CSP to VS
7061 BC847B
7062 PMBT2369
7063 BC847B
7064 PDTC124ET
7065 BC857B
7067 BC847B
7068 BC857B
6061 1SS131
5061 5VS
CLOCHE 4,286MHz 42415
ANTICLOCHE 4,286MHz 42415
5064 5VS
5070 5VS
LF DC/ANTICLOCHE 1,0715MHz 42414
VREF
N.C.
LIMITER/BLANKING
POWER
DIVIDER by 4
RS
LIMITER
AGC DETECTOR 1,1MHz
RECTIFIER f x2
VOLTAGE REFERENCE 2,5V
MIXER x2
SWITCH INTERFACE
P R S RS
COLOR KILLER
S
CK
10dB
6dB
15dB
P
R
60
61
62
63
64
65
66
67
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

| | |
|---|---|
| 0030 | H1 |
| 2061 | A6 |
| 2062 | B6 |
| 2063 | B7 |
| 2064 | B4 |
| 2065 | B5 |
| 2066 | B5 |
| 2067 | B6 |
| 2068 | B7 |
| 2069 | B9 |
| 2070 | B10 |
| 2071 | B1 |
| 2072 | B8 |
| 2073 | B3 |
| 2074 | B8 |
| 2075 | C7 |
| 2076 | C10 |
| 2077 | C6 |
| 2078 | D2 |
| 2079 | F3 |
| 2080 | G6 |
| 2081 | G7 |
| 2082 | G9 |
| 2083 | G9 |
| 2084 | G8 |
| 2085 | G2 |
| 2086 | G7 |
| 2087 | G8 |
| 2088 | G9 |
| 2089 | H3 |
| 2090 | G2 |
| 2091 | G2 |
| 2092 | H3 |
| 3059 | A7 |
| 3060 | A5 |
| 3061 | A9 |
| 3062 | A2 |
| 3063 | A4 |
| 3064 | B8 |
| 3065 | B4 |
| 3066 | B6 |
| 3067 | B8 |
| 3068 | B8 |
| 3069 | B9 |
| 3070 | B2 |
| 3071 | C11 |
| 3072 | C10 |
| 3073 | C6 |
| 3074 | C2 |
| 3075 | G1 |
| 3076 | D3 |
| 3077 | D3 |
| 3078 | E3 |
| 3079 | F8 |
| 3080 | G4 |
| 3081 | G5 |
| 3082 | G5 |
| 3083 | F2 |
| 3084 | G10 |
| 3085 | G7 |
| 3086 | G3 |
| 3087 | G6 |
| 3088 | H4 |
| 3089 | G1 |
| 5061 | A8 |
| 5062 | B9 |
| 5063 | B6 |
| 5064 | B10 |
| 5065 | B6 |
| 5066 | B9 |
| 5067 | C3 |
| 5068 | F9 |
| 5069 | G9 |
| 5070 | G5 |
| 5071 | H3 |
| 5072 | G2 |
| 5073 | H2 |
| 6061 | B2 |
| 7061 | A3 |
| 7062 | A5 |
| 7063 | B8 |
| 7064 | B3 |
| 7065 | D2 |
| 7066 | E7 |
| 7067 | F2 |
| 7068 | A7 |
| F9061 | G11 |
| F9062 | G7 |
| F9063 | G6 |
| F9064 | C3 |
| F9065 | C5 |
| F9066 | C8 |
| F9067 | B10 |
| F9068 | G8 |
| F9069 | A3 |
| F9071 | C6 |
| I050 | D1 |
| I051 | D3 |
| I052 | D3 |
| I053 | F2 |
| I054 | F1 |
| I055 | G2 |
| I056 | H2 |
| I057 | H3 |
| I058 | G4 |
| I059 | G4 |
| I060 | G5 |
| I061 | B2 |
| I062 | B2 |
| I063 | C3 |
| I064 | B3 |
| I065 | A4 |
| I066 | A4 |
| I067 | A6 |
| I068 | A6 |
| I069 | A6 |
| I070 | B5 |
| I071 | A7 |
| I072 | B7 |
| I073 | A8 |
| I074 | C6 |
| I075 | C7 |
| I076 | C7 |
| I077 | C8 |
| I078 | B8 |
| I079 | B8 |
| I080 | A9 |
| I081 | B9 |
| I082 | B9 |
| I084 | B11 |
| I085 | G1( |
| I086 | G9 |
| I087 | F9 |
| I088 | G8 |
| I089 | D2 |
| I090 | G8 |
| I091 | F8 |
| I092 | G7 |
| I093 | G6 |
| I094 | G6 |

## Chroma Noise Reduction (CNR)

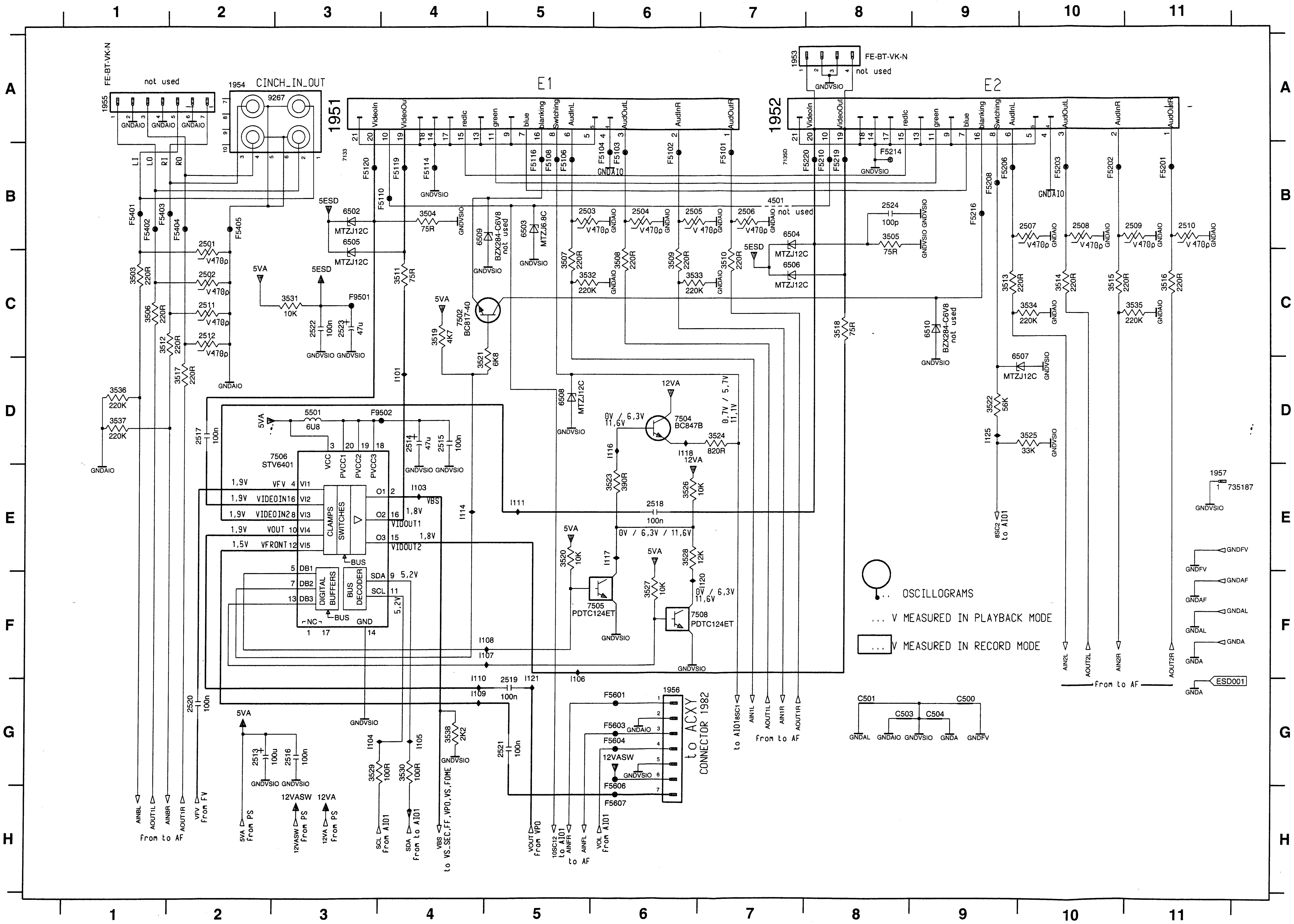
**Interconnections Manual Page**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
42
VCCD1 from VS
1801
2,1V
3,9V
F9808
7801
BFS20
1,3V
1803
3808 2K7
3809 1K5
1804
2804 47u
GNDCNR
5VASWA
3801 2K7
2801 10p
VCCD2 from VS
1805
2,2V
7804
BFS20
F9809
3,7V
3814 2K7
2806 10p
1807
1,5V
3815 330R
1808
GAIN
3817 2K2
1809
2812 47u
3816 2K7
3802 2K7
2802 100n
3803 100K
1814
1811
3805 100K
1816
3806 47R
3810 1K8
1813
3807 100K
3811 100K
2805 1u
2807 680p
2808 1u
1815
2809 1u
2810 1u
1819
7803-4B LM339D
7803-4A LM339D
7803-4D LM339D
7803-4C LM339D
2803 100n
3819 18K
1818
0,1V
3820 18K
2828 1n
2829 1n
1838
2,2V
5V
1839
3804 10K
1817
3812 8K2
2811 10n
7802
BC857B
5,1V
4,1V
2,7V
1820
3813 22K
5,1V
1832
3821 22K
7805 PDTA124ET
CNR from PE
1810
CSPO from VS
5VASWA
GNDVS
C820
GNDVS
GNDCNR
2816 10n
5803 BLM21
1837
5801 10U
5804 BLM21
1836
5,1V
7807
TA1225N
3822 22K
1821
F9810
2813 100n
1823
2815 10n
1824
2814 10n
1825
2,5V
2,7V
4V
1,3V
2V
2,5V
2,6V
1,4V
LIM K-fac.
FADJ
BPF
VOB
VGG
AGC
APC
S/H2
S/H1
INP BIAS
APC DET
AGC DET
CCD
CLOCK DRIVER
PLL
12 10,2V
2817 100n
11 2,4V
1827
10 2,6V
1828
5807 BLM21
9 F9802
5VASWA
5802 10U
2818 10n
3818 820R
2820 4n7
1835
2,6V
7806 PDTA124ET
3824 100R
FSC from VS
2821 10n
2822 4u7
2823 47u
3823 470K
2824 1u
1834
1833
1,2V
2,6V
2,4V
3V
2825 10n
5805 BLM21
CSP to VS
F9801
2826 10n
2827 10u
5806 BLM21
1829
1830
2819 10n
REC
A: AC. 100mV/Div. 10us/Div
IC 7005 Pin 42
2V
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE

| | |
|---|---|
| 2801 | A2 |
| 2802 | B3 |
| 2803 | B5 |
| 2804 | B2 |
| 2805 | B4 |
| 2806 | B3 |
| 2807 | B4 |
| 2808 | B4 |
| 2809 | C4 |
| 2810 | C4 |
| 2811 | C7 |
| 2812 | C2 |
| 2813 | D7 |
| 2814 | D8 |
| 2815 | D7 |
| 2816 | D5 |
| 2817 | D8 |
| 2818 | E9 |
| 2819 | F9 |
| 2820 | E9 |
| 2821 | F5 |
| 2822 | F6 |
| 2823 | F6 |
| 2824 | F6 |
| 2825 | F7 |
| 2826 | F8 |
| 2827 | F8 |
| 2828 | B6 |
| 2829 | C6 |
| 3801 | A2 |
| 3802 | A3 |
| 3803 | A4 |
| 3804 | B7 |
| 3805 | A4 |
| 3806 | A4 |
| 3807 | A4 |
| 3808 | B1 |
| 3809 | A2 |
| 3810 | B4 |
| 3811 | B4 |
| 3812 | B7 |
| 3813 | C8 |
| 3814 | B2 |
| 3815 | C2 |
| 3816 | C1 |
| 3817 | C2 |
| 3818 | E9 |
| 3819 | B6 |
| 3820 | C6 |
| 3821 | C5 |
| 3822 | D6 |
| 3823 | F6 |
| 3824 | F4 |
| 5801 | E4 |
| 5802 | F8 |
| 5803 | D5 |
| 5804 | E5 |
| 5805 | F7 |
| 5806 | F8 |
| 5807 | E8 |
| 7801 | A1 |
| 7802 | B8 |
| 7803 | B5 |
| 7803 | C5 |
| 7803 | B7 |
| 7803 | C7 |
| 7804 | B1 |
| 7805 | D4 |
| 7806 | E4 |
| 7807 | D6 |
| C820 | E1 |
| F9801 | F8 |
| F9802 | E8 |
| F9808 | A2 |
| F9809 | B2 |
| F9810 | D' |
| I801 | A1 |
| I803 | A2 |
| I804 | B2 |
| I805 | B1 |
| I807 | C2 |
| I808 | C2 |
| I809 | C2 |
| I810 | D3 |
| I811 | A4 |
| I813 | A4 |
| I814 | A5 |
| I815 | B5 |
| I816 | A5 |
| I817 | B7 |
| I818 | B6 |
| I819 | C5 |
| I820 | B8 |
| I821 | D6 |
| I823 | D7 |
| I824 | D7 |
| I825 | D8 |
| I827 | E8 |
| I828 | E8 |
| I829 | F9 |
| I830 | F9 |
| I832 | C4 |
| I833 | E7 |
| I834 | E6 |
| I835 | E6 |
| I836 | E6 |
| I837 | D6 |
| I838 | C6 |
| I839 | C7 |

## Input/Output (I_O)

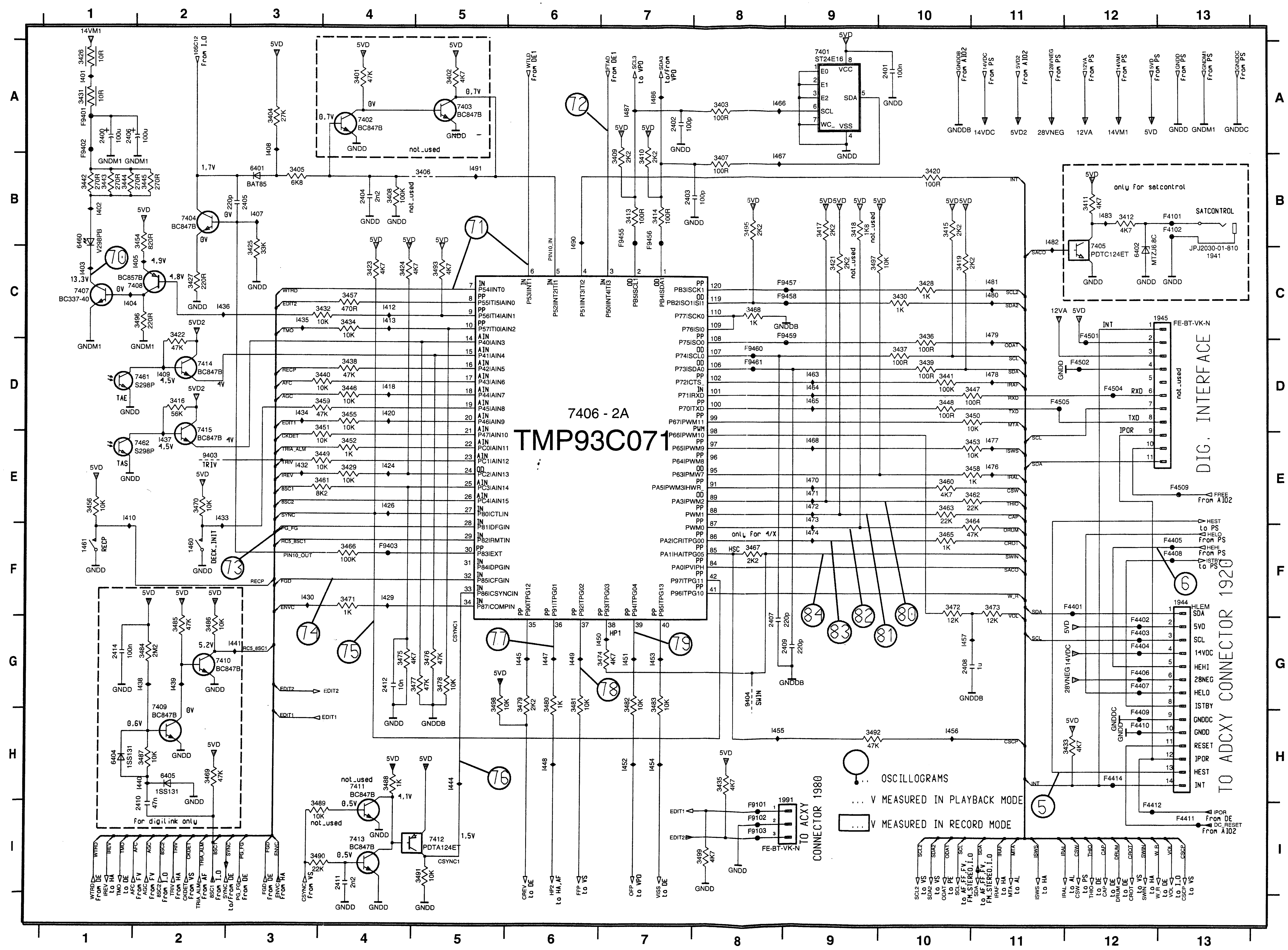

1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
FE-BT-VK-N
not used
1955
GNDAIO
1954 CINCH_IN_OUT
9267
E1
1951
VideoIn
VideoOut
redic
green
blue
blanking
Switching
AudInL
AudOutL
AudInR
AudOutR
E2
1952
1953
FE-BT-VK-N
not used
GNDVSIO
L1
LO
RI
RO
F5401
F5402
F5403
F5404
F5405
F5120
F5119
F5110
F5114
F5116
F5108
F5106
F5104
F5103
F5102
F5101
F5220
F5210
F5219
F5214
F5216
F5208
F5206
F5203
F5202
F5201
GNDAIO
GNDVSIO
5ESD
6502
6505
MTZJ12C
3504 75R
6509 BZX284-C6V8 not used
6503 MTZJ6.8C
2503
2504
2505
2506
V470p
4501 not used
2524 100p
3505 75R
6504
6506
2507
2508
2509
2510
2501
2502
2511
2512
3503 220R
3506 220R
3512 220R
3517 220R
5VA
3531 10K
F9501
2522 100n
2523 47u
3511 75R
7502 BC817-40
3519 4K7
3521 6K8
3507 220R
3508 220R
3509 220R
3510 220R
3532 220K
3533 220K
3518 75R
6510 BZX284-C6V8 not used
3513 220R
3514 220R
3515 220R
3516 220R
3534 220K
3535 220K
6507 MTZJ12C
3522 56K
3525 33K
I125
8SC2 to AI01
3536 220K
3537 220K
2517 100n
5501 6U8
F9502
2514 47u
2515 100n
7506 STV6401
VCC
PVCC1
PVCC2
PVCC3
1,9V VFV 4 VI1
1,9V VIDEOIN1 6 VI2
1,9V VIDEOIN2 8 VI3
1,9V VOUT 10 VI4
1,5V VFRONT 12 VI5
CLAMPS
SWITCHES
O1 2
O2 16 VIDOUT1 1,8V
O3 15 VIDOUT2 1,8V
VBS
BUS
DB1
DB2
DB3
DIGITAL BUFFERS
BUS DECODER
SDA 9 5,2V
SCL 11 5,2V
NC
GND
I101
I103
I111
I114
6508 MTZJ12C
12VA
7504 BC847B
0V / 6,3V 11,6V
0,7V / 5,7V 11,1V
3524 820R
I116
I118
3523 390R
3526 10K
2518 100n
0V / 6,3V / 11,6V
3520 10K
3528 12K
I117
I120
3527 10K
7505 PDTC124ET
7508 PDTC124ET
0V / 6,3V 11,6V
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
... V MEASURED IN RECORD MODE
1957 735187
GNDFV
GNDAF
GNDAL
GNDA
ESD001
AIN2L
AOUT2L
AIN2R
AOUT2R
from to AF
C501
C500
C503
C504
I108
I107
I110
I109
2519 100n
I121
I106
2520 100n
2513 100u
2516 100n
12VASW
I104
I105
3529 100R
3530 100R
3538 2K2
2521 100n
F5601
F5603
F5604
F5606
F5607
1956
to ACXY CONNECTOR 1982
AINBL
AOUT1L
AINBR
AOUT1R
VFV from FV
from to AF
5VA from PS
12VASW from PS
12VA from PS
SCL from AI01
SDA from to AI01
VBS to VS_SEC,FF,VPO,VS,FDME
VOUT from VPO
1OSC12 to AI01
AINFR
AINFL to AF
VOL from AI01
to AI01 8SC1
AIN1L
AOUT1L
AIN1R
AOUT1R
from to AF

| | | | |
|---|---|---|---|
| 1951 A3 | 3513 C9 | 7508 F6 | F5119 B4 |
| 1952 A7 | 3514 C10 | C500 G9 | F5120 B3 |
| 1953 A7 | 3515 C10 | C501 G8 | F5201 B11 |
| 1954 A2 | 3516 C11 | C503 G8 | F5202 B1 |
| 1955 A1 | 3517 D2 | C504 G9 | F5203 B1 |
| 1956 G6 | 3518 C8 | ESD001 G11 | F5206 B9 |
| 1957 E11 | 3519 C4 | F5101 B7 | F5208 B9 |
| 2501 B2 | 3520 E5 | F5102 B6 | F5210 B8 |
| 2502 C2 | 3521 D4 | F5103 B6 | F5214 B8 |
| 2503 B5 | 3522 D9 | F5104 B6 | F5216 B9 |
| 2504 B6 | 3523 E6 | F5106 B5 | F5219 B8 |
| 2505 B6 | 3524 D7 | F5108 B5 | F5220 B8 |
| 2506 B7 | 3525 D10 | F5110 B4 | F5401 B1 |
| 2507 B10 | 3526 E6 | F5114 B4 | F5402 B1 |
| 2508 B10 | 3527 F6 | F5116 B5 | F5403 B1 |
| 2509 B11 | 3528 E6 | | F5404 B2 |
| 2510 B11 | 3529 G3 | | F5405 B2 |
| 2511 C2 | 3530 G4 | | F5601 G6 |
| 2512 C2 | 3531 C3 | | F5603 G6 |
| 2513 G2 | 3532 C5 | | F5604 G6 |
| 2514 D4 | 3533 C6 | | F5606 G6 |
| 2515 D4 | 3534 C10 | | F5607 H6 |
| 2516 G3 | 3535 C11 | | F9501 C3 |
| 2517 D2 | 3536 D1 | | F9502 D4 |
| 2518 E6 | 3537 D1 | | I101 D4 |
| 2519 G5 | 3538 G4 | | I103 E4 |
| 2520 G2 | 4501 B7 | | I104 G3 |
| 2521 G5 | 5501 D3 | | I105 G4 |
| 2522 C3 | 6502 B3 | | I106 G5 |
| 2523 C3 | 6503 B5 | | I107 F5 |
| 2524 B8 | 6504 B7 | | I108 F5 |
| 3503 C1 | 6505 B3 | | I109 G4 |
| 3504 B4 | 6506 C7 | | I110 G4 |
| 3505 B8 | 6507 D10 | | I111 E5 |
| 3506 C1 | 6508 D5 | | I114 E4 |
| 3507 C5 | 6509 B4 | | I116 D6 |
| 3508 C6 | 6510 C9 | | I117 E6 |
| 3509 C6 | 7502 C4 | | I118 D6 |
| 3510 C7 | 7504 D6 | | I120 F7 |
| 3511 C4 | 7505 F5 | | I121 G5 |
| 3512 C1 | 7506 D2 | | I125 D9 |

## Central / Deck Control 1 (AIO1)

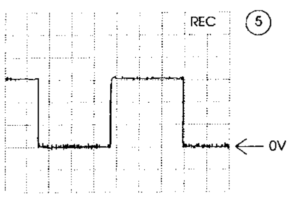
**Interconnections Manual Page**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| AF 3-26 | AIO2 3-41 | CNR 3-36 | DE 3-42 | FF 3-43 | FOME 3-44 | HA 3-32 | PE 3-40 | QNIC 3-46 | VS 3-31 |
| AIO1 3-38 | AL 3-28 | DC 3-48 | ER 3-27 | FM_STEREO 3-25 | FV 3-24 | I_O 3-37 | PS 3-22 | VPO 3-45 | VS_SEC 3-35 |

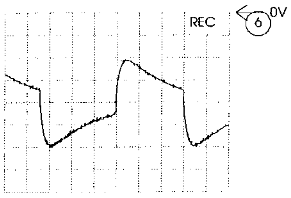

1
2
3
4
5
6
7
8
9
10
11
12
13
A
B
C
D
E
F
G
H
I
7406 - 2A
TMP93C071
7401
ST24E16
VCC
E0
E1
E2
SCL
SDA
WC_
VSS
7402 BC847B
7403 BC847B
not_used
7404 BC847B
7405 PDTC124ET
7407 BC337-40
7408 BC857B
7409 BC847B
7410 BC847B
7411 BC847B
7412 PDTA124ET
7413 BC847B
7414 BC847B
7415 BC847B
7461 S298P
7462 S298P
TAE
TAS
6401 BAT85
6402 MTZJ6.8C
6404 1SS131
6405 1SS131
6460 V298PB
for digilink only
only for setcontrol
SATCONTROL
JPJ2030-01-810
1941
only for 4/X
RECP
DECK_INIT
TRIV
1945 FE-BT-VK-N
DIG. INTERFACE
not_used
INT
RXD
TXD
IPOR
1944
HLEM
SDA
5VD
SCL
14VDC
HEHI
28NEG
HELO
ISTBY
GNDDC
GNDD
RESET
IPOR
HEST
INT
TO ADCXY CONNECTOR 1920
1991 FE-BT-VK-N
TO ACXY CONNECTOR 1980
EDIT1
EDIT2
OSCILLOGRAMS
... V MEASURED IN PLAYBACK MODE
V MEASURED IN RECORD MODE
5VD
5VD2
GNDD
GNDDB
GNDM1
14VM1
12VA
28VNEG
14VDC
GNDDC
(5)
(6)
(70)
(71)
(72)
(73)
(74)
(75)
(76)
(77)
(78)
(79)
(80)
(81)
(82)
(83)
(84)
WTRD from DE
IREV to DE
TMO to DE
AFC from FV
AGC from FV
8SC2 from I_O
TRIV from VS
CKDET from VS
TRIA_ALM from AF
8SC1 from I_O
SYNC from DE
PG_FG from DE
FGD from DE
ENVC from HA
CSYNC from VS
CREV to DE
HP2 to HA,AF
FFP to VS
OFP to VPO
VSS to DE
SCL2 to VS
SDA2 to VS
ODAT to PE
SCL to AF,FF,FV,FM_STEREO,I_O
SDA to AF,FF,FV,FM_STEREO,I_O
IRAF to HA
MTA to AL
ISWS to HA
IRAL to AL
CSW to PS
THIO to DE
CAP to DE
DRUM to DE
CROT to DE
SWIN to VS
W_R to HA
VOL to I_O
CSCP to VS

| | |
|---|---|
| 0020 | D1 |
| 0021 | B1 |
| 0022 | E1 |
| 0031 | F1 |
| 1460 | F2 |
| 1461 | F1 |
| 1941 | C13 |
| 1944 | F13 |
| 1945 | C12 |
| 1991 | I8 |
| 2400 | A1 |
| 2401 | A10 |
| 2402 | A7 |
| 2403 | B7 |
| 2404 | B4 |
| 2405 | B3 |
| 2406 | A1 |
| 2407 | G8 |
| 2408 | G10 |
| 2409 | G9 |
| 2410 | I2 |
| 2411 | I4 |
| 2412 | G4 |
| 2414 | G1 |
| 3401 | A4 |
| 3402 | A5 |
| 3403 | A8 |
| 3404 | A3 |
| 3405 | B3 |
| 3406 | B5 |
| 3407 | B8 |
| 3408 | B4 |
| 3409 | B7 |
| 3410 | B7 |
| 3411 | B12 |
| 3412 | B12 |
| 3413 | B7 |
| 3414 | B7 |
| 3415 | B10 |
| 3416 | D2 |
| 3417 | B9 |
| 3418 | B9 |
| 3419 | C10 |
| 3420 | B10 |
| 3421 | C9 |
| 3422 | C2 |
| 3423 | C4 |
| 3424 | C4 |
| 3425 | C3 |
| 3426 | A1 |
| 3427 | C2 |
| 3428 | C10 |
| 3429 | E4 |
| 3430 | C10 |
| 3431 | A1 |
| 3432 | C4 |
| 3433 | H12 |
| 3434 | C4 |
| 3435 | H8 |
| 3436 | C10 |
| 3437 | D10 |
| 3438 | D4 |
| 3439 | D10 |
| 3440 | D4 |
| 3441 | D10 |
| 3442 | B1 |
| 3443 | B1 |
| 3444 | B1 |
| 3445 | B2 |
| 3446 | D4 |
| 3447 | D11 |
| 3448 | D10 |
| 3449 | E4 |
| 3450 | D11 |
| 3451 | D4 |
| 3452 | E4 |
| 3453 | E11 |
| 3454 | B2 |
| 3455 | D4 |
| 3456 | E1 |
| 3457 | C4 |
| 3458 | E11 |
| 3459 | D4 |
| 3460 | E10 |
| 3461 | E4 |
| 3462 | E11 |
| 3463 | E10 |
| 3464 | E11 |
| 3465 | F10 |
| 3466 | F4 |
| 3467 | F8 |
| 3468 | C8 |
| 3469 | H2 |
| 3470 | E2 |
| 3471 | F4 |
| 3472 | F10 |
| 3473 | F11 |
| 3474 | G7 |
| 3475 | G4 |
| 3476 | G5 |
| 3477 | G5 |
| 3478 | G5 |
| 3479 | G6 |
| 3480 | G6 |
| 3481 | G6 |
| 3482 | G7 |
| 3483 | G7 |
| 3484 | G2 |
| 3485 | G2 |
| 3486 | G2 |
| 3487 | H2 |
| 3488 | H4 |
| 3489 | I3 |
| 3490 | I3 |
| 3491 | I5 |
| 3492 | H9 |
| 3493 | C5 |
| 3495 | B8 |
| 3496 | C2 |
| 3497 | C9 |
| 3498 | G5 |
| 3499 | I8 |
| 6401 | B3 |
| 6402 | C12 |
| 6404 | H1 |
| 6405 | H2 |
| 6460 | B1 |
| 7401 | A9 |
| 7402 | A4 |
| 7403 | A5 |
| 7404 | B2 |
| 7405 | C12 |
| 7406 | D6 |
| 7407 | C1 |
| 7408 | C2 |
| 7409 | H2 |
| 7410 | G2 |
| 7411 | H4 |
| 7412 | I5 |
| 7413 | I4 |
| 7414 | D2 |
| 7415 | E2 |
| 7461 | D1 |
| 7462 | E1 |
| 9403 | E2 |
| 9404 | G8 |
| F4101 | B13 |
| F4102 | B13 |
| F4401 | F12 |
| F4402 | G12 |
| F4403 | G12 |
| F4404 | G12 |
| F4405 | F13 |
| F4406 | G12 |
| F4407 | G12 |
| F4408 | F13 |
| F4409 | H12 |
| F4410 | H12 |
| F4411 | I13 |
| F4412 | I12 |
| F4414 | H12 |
| F4501 | C12 |
| F4502 | D12 |
| F4504 | D12 |
| F4505 | D11 |
| F4509 | E13 |
| F9101 | I8 |
| F9102 | I8 |
| F9103 | I8 |
| F9401 | A1 |
| F9402 | A1 |
| F9403 | F4 |
| F9455 | B7 |
| F9456 | B7 |
| F9457 | C9 |
| F9458 | C9 |
| F9459 | C9 |
| F9460 | D8 |
| F9461 | D8 |
| I401 | A1 |
| I402 | B1 |
| I403 | C1 |
| I404 | C1 |
| I405 | C1 |
| I407 | B3 |
| I408 | A3 |
| I409 | D2 |
| I410 | E1 |
| I412 | C4 |
| I413 | C4 |
| I418 | D4 |
| I420 | D4 |
| I424 | E4 |
| I426 | E4 |
| I429 | F4 |
| I430 | F3 |
| I432 | E3 |
| I433 | E2 |
| I434 | D3 |
| I435 | C3 |
| I436 | C2 |
| I437 | E2 |
| I438 | G2 |
| I439 | G2 |
| I440 | H2 |
| I441 | G3 |
| I444 | H5 |
| I445 | G6 |
| I447 | G6 |
| I448 | H6 |
| I449 | G6 |
| I450 | G6 |
| I451 | G7 |
| I452 | H7 |
| I453 | G7 |
| I454 | H7 |
| I455 | H8 |
| I456 | H10 |
| I457 | G10 |
| I463 | D9 |
| I464 | D9 |
| I465 | D9 |
| I466 | A8 |
| I467 | B8 |
| I468 | E9 |
| I470 | E9 |
| I471 | E9 |
| I472 | E9 |
| I473 | E9 |
| I474 | F9 |
| I476 | E11 |
| I477 | E11 |
| I478 | D11 |
| I479 | C11 |
| I480 | C11 |
| I481 | C11 |
| I482 | B11 |
| I483 | B12 |
| I486 | A7 |
| I487 | A7 |
| I490 | B6 |
| I491 | B5 |

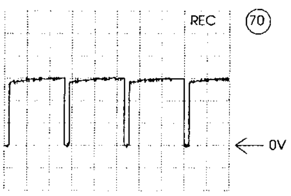
# Oscillograms Central / Deck Control



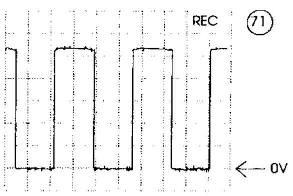
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13



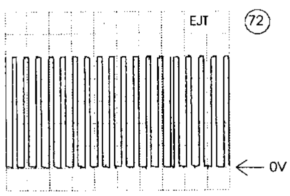
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5



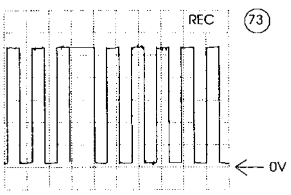
A: DC, 5 V/Div, 5ms/Div
Collector 7407



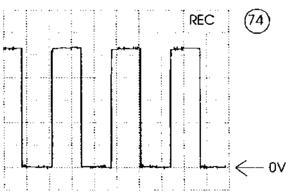
A: DC, 1 V/Div, 200ms/Div
IC 7406 Pin 6/7



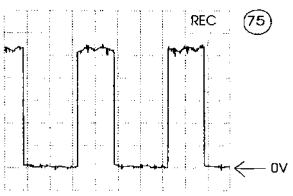
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



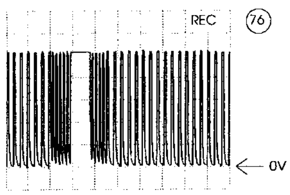
A: DC, 1 V/Div, 2ms/Div
IC 7406 Pin 28



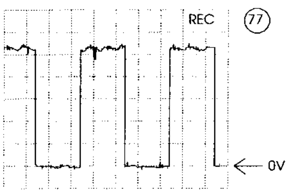
A: DC, 1 V/Div, 500us/Div
IC 7406 Pin 32



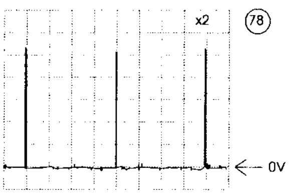
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 27/42



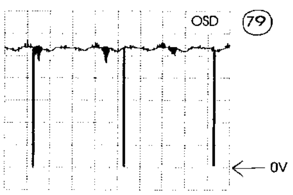
A: DC, 1 V/Div, 200us/Div
IC 7406 Pin 33



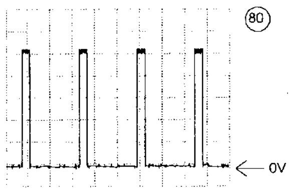
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 36



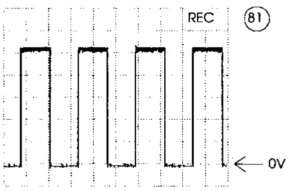
A: DC, 1 V/Div, 5ms/Div
IC 7406 Pin 37



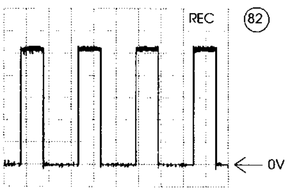
A: DC, 1 V/Div, 5ms/Div
IC 7406 Pin 39



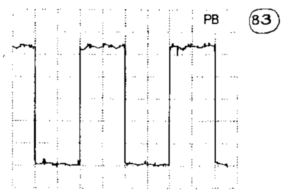
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 89



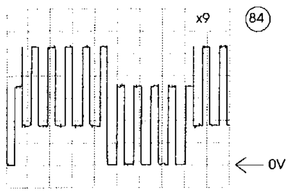
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 88



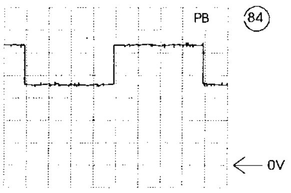
A: DC, 1 V/Div, 10us/Div
IC 7406 Pin 87



A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 86

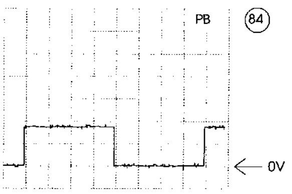


A: DC, 1 V/Div, 5ms/Div
SWIN



A: DC, 1 V/Div, 5ms/Div
SWIN

Longplay

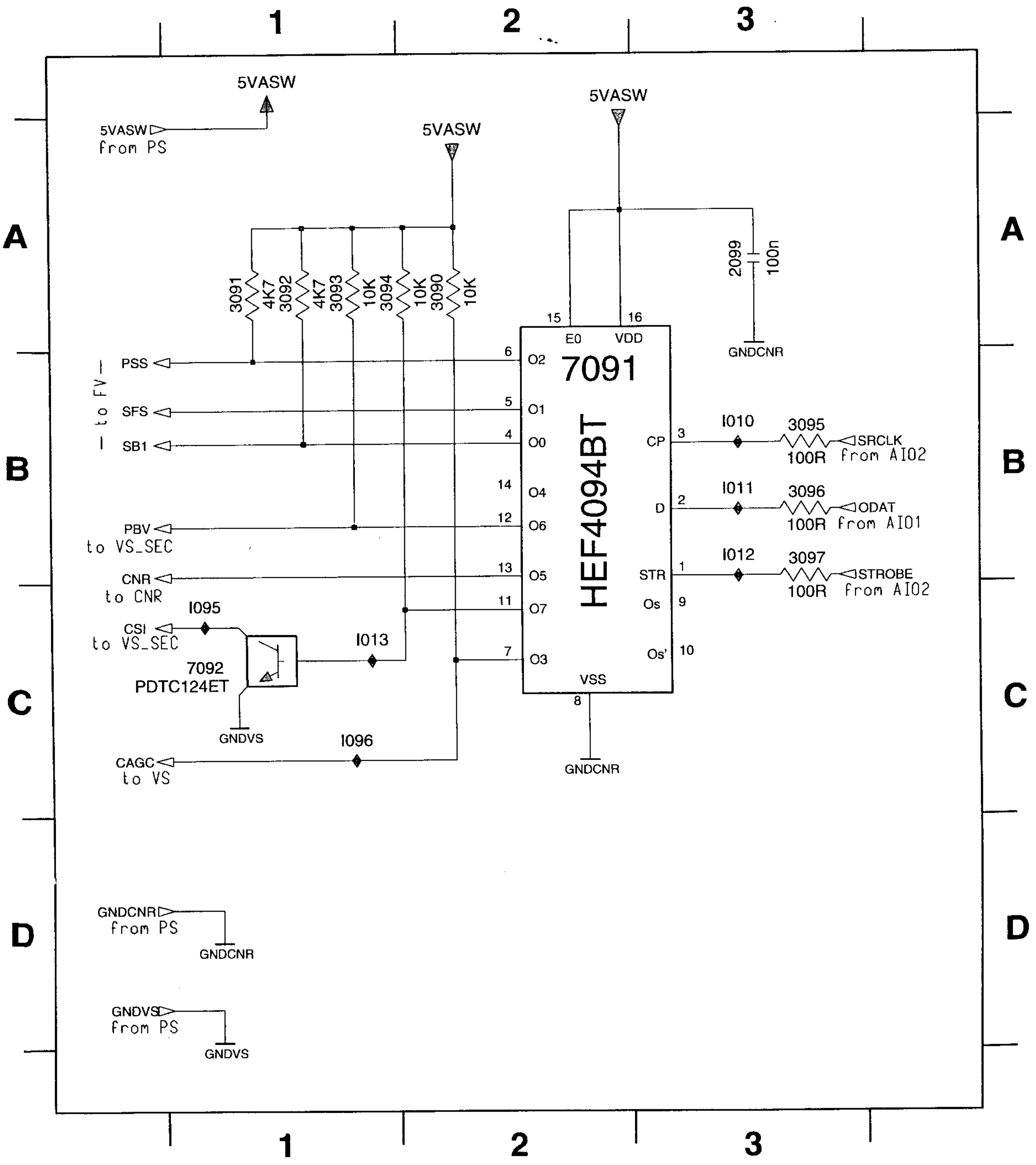


A: DC, 1 V/Div, 5ms/Div
SWIN

Standard Play

## Port Expander (PE)

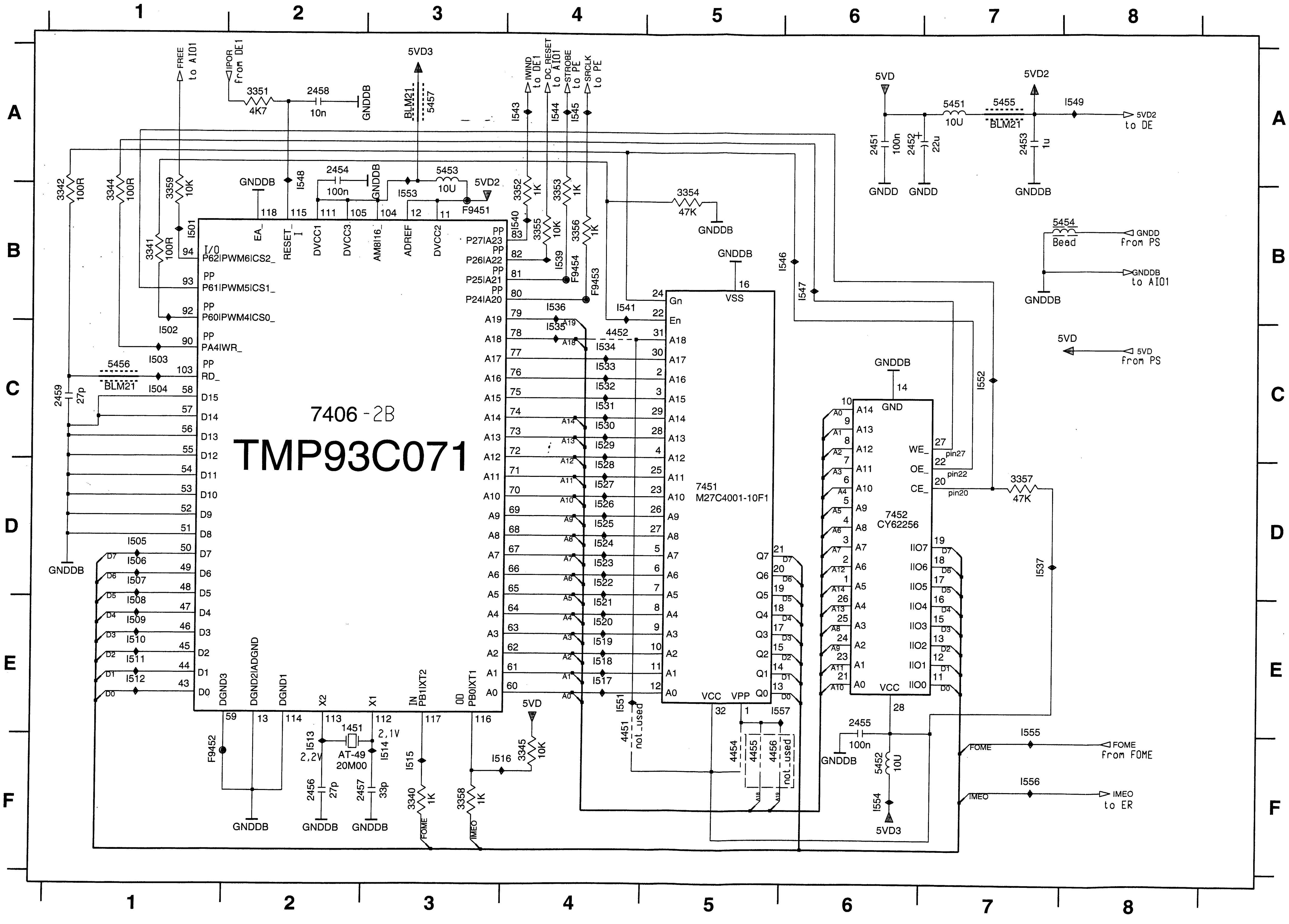
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **2099 A3** | **3091 A1** | **3093 A1** | **3095 B3** | **3097 B3** | **7092 C1** | **I011 B3** | **I013 C1** | **I096 C1** |
| **3090 A2** | **3092 A1** | **3094 A1** | **3096 B3** | **7091 B2** | **I010 B3** | **I012 B3** | **I095 C1** | |


1
2
3
A
B
C
D
5VASW
5VASW
from PS
5VASW
5VASW
3091 4K7
3092 4K7
3093 10K
3094 10K
3090 10K
2099 100n
GNDCNR
15
16
E0
VDD
7091
HEF4094BT
— to FV —
PSS
SFS
SB1
6 O2
5 O1
4 O0
14 O4
12 O6
13 O5
11 O7
7 O3
CP 3
D 2
STR 1
Os 9
Os' 10
VSS
8
GNDCNR
I010
3095
100R
SRCLK
from AI02
I011
3096
100R
ODAT
from AI01
I012
3097
100R
STROBE
from AI02
PBV
to VS_SEC
CNR
to CNR
I095
CSI
to VS_SEC
7092
PDTC124ET
I013
GNDVS
I096
CAGC
to VS
GNDCNR
from PS
GNDCNR
GNDVS
from PS
GNDVS

## Central / Deck Control 2 (AIO2)

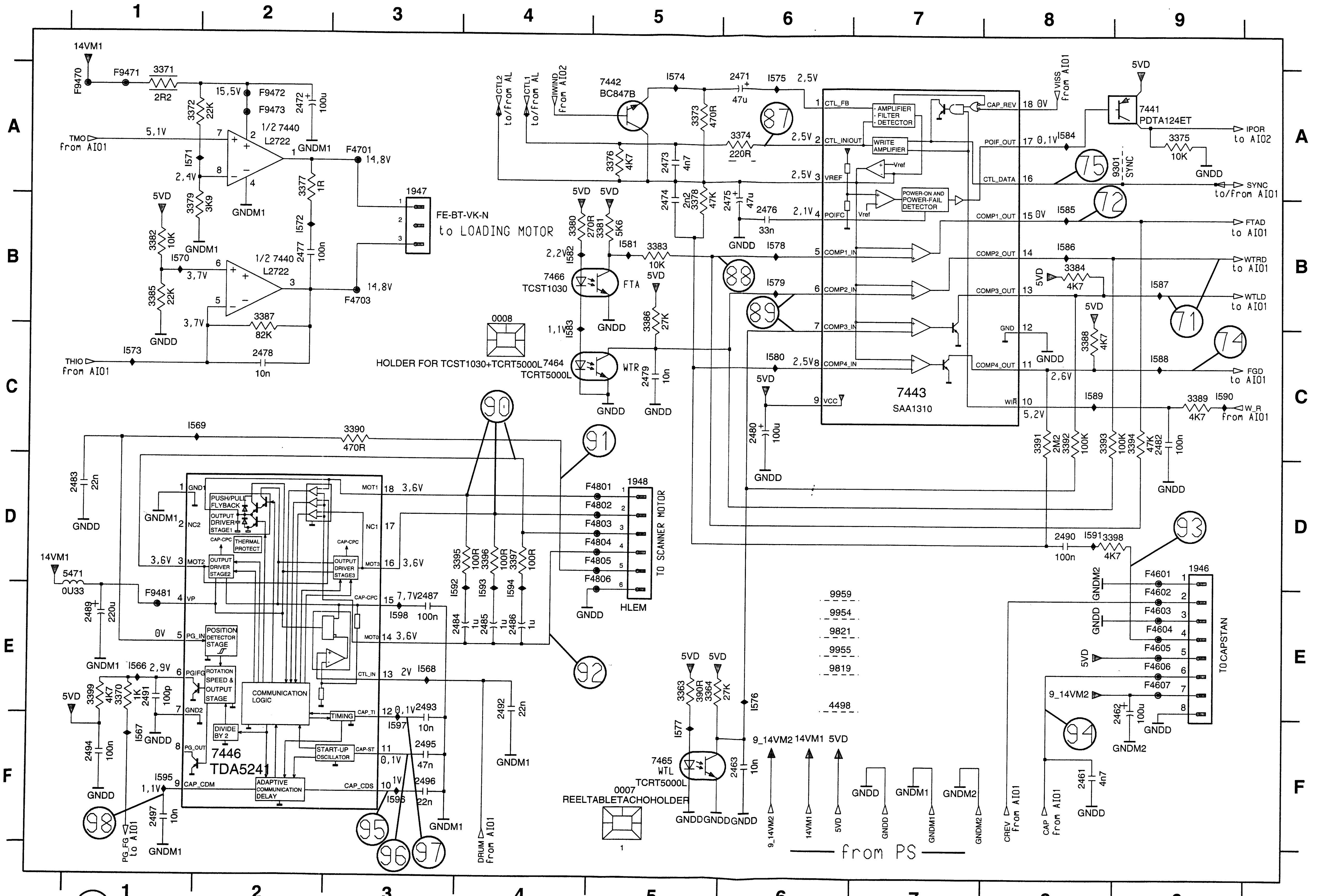
**Interconnections Manual Page**

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF | 3-26 | AIO2 | 3-41 | CNR | 3-36 | DE | 3-42 | FF | 3-43 | FOME | 3-44 | HA | 3-32 | PE | 3-40 | QNIC | 3-46 | VS | 3-31 | | |
| AIO1 | 3-38 | AL | 3-28 | DC | 3-48 | ER | 3-27 | FM_STEREO | 3-25 | FV | 3-24 | I_O | 3-37 | PS | 3-22 | VPO | 3-45 | VS_SEC | 3-35 | | |


7406 -2B
TMP93C071
7451
M27C4001-10F1
7452
CY62256
1451
AT-49
20M00
5VD3
5VD
5VD2
GNDDB
GNDD
FREE to AIO1
IPOR from DE1
IWIND to DE1
DC_RESET to AIO1
STROBE to PE
SRCLK to PE
5VD2 to DE
GNDD from PS
GNDDB to AIO1
5VD from PS
FOME From FOME
IMEO to ER
BLM21
Bead
not_used
3351 4K7
2458 10n
2454 100n
5453 10U
3342 100R
3344 100R
3359 10K
3341 100R
3352 1K
3353 1K
3355 10K
3356 1K
3354 47K
3357 47K
3345 10K
3340 1K
3358 1K
2456 27p
2457 33p
2459 27p
2451 100n
2452 22u
2453 1u
5451 10U
5455
2455 100n
5452 10U
A B C D E F
1 2 3 4 5 6 7 8

| | |
|---|---|
| 1451 | E2 |
| 2451 | A6 |
| 2452 | A6 |
| 2453 | A7 |
| 2454 | A2 |
| 2455 | E6 |
| 2456 | F2 |
| 2457 | F3 |
| 2458 | A2 |
| 2459 | C1 |
| 3340 | F3 |
| 3341 | B1 |
| 3342 | B1 |
| 3344 | B1 |
| 3345 | F4 |
| 3351 | A2 |
| 3352 | B4 |
| 3353 | B4 |
| 3354 | B5 |
| 3355 | B4 |
| 3356 | B4 |
| 3357 | D7 |
| 3358 | F3 |
| 3359 | B1 |
| 4451 | E4 |
| 4452 | C4 |
| 4454 | F5 |
| 4455 | F5 |
| 4456 | F5 |
| 5451 | A7 |
| 5452 | F6 |
| 5453 | A3 |
| 5454 | B8 |
| 5455 | A7 |
| 5456 | C1 |
| 5457 | A3 |
| 7406 | C2 |
| 7451 | D5 |
| 7452 | D6 |
| F9451 | B3 |
| F9452 | F1 |
| F9453 | B4 |
| F9454 | B4 |
| I501 | B1 |
| I502 | C1 |
| I503 | C1 |
| I504 | C1 |
| I505 | D1 |
| I506 | D1 |
| I507 | D1 |
| I508 | E1 |
| I509 | E1 |
| I510 | E1 |
| I511 | E1 |
| I512 | E1 |
| I513 | F2 |
| I514 | F3 |
| I515 | F3 |
| I516 | F4 |
| I517 | E4 |
| I518 | E4 |
| I519 | E4 |
| I520 | E4 |
| I521 | E4 |
| I522 | D4 |
| I523 | D4 |
| I524 | D4 |
| I525 | D4 |
| I526 | D4 |
| I527 | D4 |
| I528 | D4 |
| I529 | C4 |
| I530 | C4 |
| I531 | C4 |
| I532 | C4 |
| I533 | C4 |
| I534 | C4 |
| I535 | C4 |
| I536 | B4 |
| I537 | D7 |
| I539 | B4 |
| I540 | B4 |
| I541 | B4 |
| I543 | A4 |
| I544 | A4 |
| I545 | A4 |
| I546 | B5 |
| I547 | B6 |
| I548 | A2 |
| I549 | A8 |
| I551 | E4 |
| I552 | C7 |
| I553 | B3 |
| I554 | F6 |
| I555 | E7 |
| I556 | F7 |
| I557 | E6 |

## Deck Electronics (DE)


1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
14VM1
F9470
F9471
3371
2R2
15,5V
F9472
F9473
2472
100u
3372
22K
1/2 7440
L2722
TMO
from AI01
5,1V
1571
2,4V
GNDM1
F4701
14,8V
3377
1R
5VD
3379
3K9
3382
10K
GNDM1
1570
3,7V
1/2 7440
L2722
2477
100n
1572
14,8V
F4703
3385
22K
3,7V
3387
82K
GNDD
THIO
from AI01
1573
2478
10n
1947
FE-BT-VK-N
to LOADING MOTOR
CTL2 to/from AL
CTL1 to/from AL
IWIND from AI02
7442
BC847B
1574
2471
47u
1575
2,5V
3373
470R
3374
220R
3376
4K7
2473
4n7
2474
2n2
3378
47K
2475
47u
2476
33n
2,1V
GNDD
1578
5VD
3380
270R
3381
5K6
2,2V
1582
1581
3383
10K
7466
TCST1030
FTA
5VD
3386
27K
1,1V
1583
GNDD
0008
HOLDER FOR TCST1030+TCRT5000L
7464
TCRT5000L
WTR
2479
10n
GNDD
1579
1580
2,5V
5VD
2480
100u
GNDD
7443
SAA1310
CTL_FB
CTL_IN/OUT
VREF
POIFC
COMP1_IN
COMP2_IN
COMP3_IN
COMP4_IN
VCC
AMPLIFIER - FILTER - DETECTOR
WRITE AMPLIFIER
Vref
POWER-ON AND POWER-FAIL DETECTOR
CAP_REV
POIF_OUT
CTL_DATA
COMP1_OUT
COMP2_OUT
COMP3_OUT
GND
COMP4_OUT
WIR
18 0V
17 0,1V
15 0V
VISS from AI01
5VD
7441
PDTA124ET
1584
3375
10K
GNDD
IPOR to AI02
9301 SYNC
SYNC to/from AI01
1585
FTAD to AI01
1586
3384
4K7
WTRD to AI01
1587
WTLD to AI01
5VD
3388
4K7
GNDD
1588
FGD to AI01
2,6V
1589
5,2V
3389
4K7
1590
W_R from AI01
3391
2M2
3392
100K
3393
100K
3394
47K
2482
100n
GNDD
1569
3390
470R
2483
22n
GNDD
PUSH/PULL FLYBACK
OUTPUT DRIVER STAGE1
THERMAL PROTECT
OUTPUT DRIVER STAGE2
OUTPUT DRIVER STAGE3
POSITION DETECTOR STAGE
ROTATION SPEED & OUTPUT STAGE
COMMUNICATION LOGIC
DIVIDE BY 2
TIMING
START-UP OSCILLATOR
ADAPTIVE COMMUNICATION DELAY
GND1
NC2
MOT2
VP
PG_IN
PGIFG
GND2
PG_OUT
CAP_CDM
MOT1
NC1
MOT3
CAP-CPC
MOT0
CTL_IN
CAP_TI
CAP-ST
CAP_CDS
7446
TDA5241
GNDM1
3,6V
14VM1
5471
0U33
F9481
2489
220u
0V
GNDM1
1566
2,9V
5VD
3399
4K7
3370
1K
2491
100p
1567
GNDD
2494
100n
GNDD
1595
1,1V
2497
10n
GNDM1
PG_FG to AI01
18 3,6V
17
16 3,6V
15 7,7V
2487
1598
100n
14 3,6V
13 2V
1568
12 0,1V
2493
1597
10n
11
2495
0,1V
47n
10 1V
2496
1596
22n
GNDM1
2492
22n
GNDM1
DRUM from AI01
3395
100R
3396
100R
3397
100R
1592
1593
1594
2484
1u
2485
1u
2486
1u
1948
F4801
F4802
F4803
F4804
F4805
F4806
GNDD
HLEM
TO SCANNER MOTOR
9959
9954
9821
9955
9819
4498
5VD
5VD
3363
390R
3364
27K
1577
1576
7465
WTL
TCRT5000L
2463
10n
0007
REELTABLETACHOHOLDER
GNDD
GNDD
GNDD
9_14VM2
14VM1
5VD
GNDD
GNDM1
GNDM2
9_14VM2
14VM1
5VD
GNDD
GNDM1
GNDM2
from PS
2490
100n
1591
3398
4K7
1946
GNDM2
GNDD
5VD
F4601
F4602
F4603
F4604
F4605
F4606
F4607
9_14VM2
2462
100u
GNDD
GNDM2
TO CAPSTAN
2461
4n7
GNDD
CREV from AI01
CAP from AI01
87
75
72
88
89
71
74
90
91
92
93
94
95
96
97
98

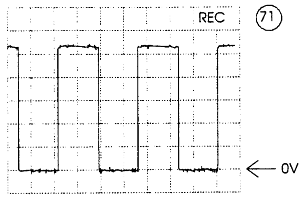
○ .. OSCILLOGRAMS

... V MEASURED IN PLAYBACK MODE

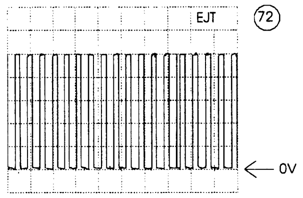
$\boxed{...}$ V MEASURED IN RECORD MODE

| | |
|---|---|
| 0007 | F5 |
| 0008 | B4 |
| 1946 | D9 |
| 1947 | A3 |
| 1948 | D5 |
| 2461 | F8 |
| 2462 | E9 |
| 2463 | F6 |
| 2471 | A6 |
| 2472 | A2 |
| 2473 | A5 |
| 2474 | B5 |
| 2475 | B6 |
| 2476 | B6 |
| 2477 | B2 |
| 2478 | C2 |
| 2479 | C5 |
| 2480 | C6 |
| 2482 | C9 |
| 2483 | D1 |
| 2484 | E4 |
| 2485 | E4 |
| 2486 | E4 |
| 2487 | E3 |
| 2489 | E1 |
| 2490 | D8 |
| 2491 | E1 |
| 2492 | E4 |
| 2493 | E3 |
| 2494 | F1 |
| 2495 | F3 |
| 2496 | F3 |
| 2497 | F1 |
| 3363 | E5 |
| 3364 | E5 |
| 3370 | E1 |
| 3371 | A1 |
| 3372 | A1 |
| 3373 | A5 |
| 3374 | A6 |
| 3375 | A9 |
| 3376 | A5 |
| 3377 | A2 |
| 3378 | B5 |
| 3379 | B1 |
| 3380 | B4 |
| 3381 | B5 |
| 3382 | B1 |
| 3383 | B5 |
| 3384 | B8 |
| 3385 | B1 |
| 3386 | B5 |
| 3387 | B2 |
| 3388 | C8 |
| 3389 | C9 |
| 3390 | C3 |
| 3391 | C8 |
| 3392 | C8 |
| 3393 | C8 |
| 3394 | C9 |
| 3395 | D4 |
| 3396 | D4 |
| 3397 | D4 |
| 3398 | D8 |
| 3399 | E1 |
| 4498 | E6 |
| 5471 | D1 |
| 7440 | A2 |
| 7440 | B2 |
| 7441 | A9 |
| 7442 | A5 |
| 7443 | C7 |
| 7446 | F2 |
| 7464 | C4 |
| 7465 | F5 |
| 7466 | B4 |
| 9301 | A8 |
| 9819 | E6 |
| 9821 | E6 |
| 9954 | E6 |
| 9955 | E6 |
| 9959 | E6 |
| F4601 | D9 |
| F4602 | E9 |
| F4603 | E9 |
| F4604 | E9 |
| F4605 | E9 |
| F4606 | E9 |
| F4607 | E9 |
| F4701 | A3 |
| F4703 | B3 |
| F4801 | D5 |
| F4802 | D5 |
| F4803 | D5 |
| F4804 | D5 |
| F4805 | D5 |
| F4806 | D5 |
| F9470 | A1 |
| F9471 | A1 |
| F9472 | A2 |
| F9473 | A2 |
| F9481 | E1 |
| I566 | E1 |
| I567 | F1 |
| I568 | E3 |
| I569 | C1 |
| I570 | B1 |
| I571 | A1 |
| I572 | B2 |
| I573 | C1 |
| I574 | A5 |
| I575 | A6 |
| I576 | E6 |
| I577 | F5 |
| I578 | B6 |
| I579 | B6 |
| I580 | C6 |
| I581 | B5 |
| I582 | B4 |
| I583 | C4 |
| I584 | A8 |
| I585 | B8 |
| I586 | B8 |
| I587 | B9 |
| I588 | C9 |
| I589 | C8 |
| I590 | C9 |
| I591 | D8 |
| I592 | E3 |
| I593 | E4 |
| I594 | E4 |
| I595 | F1 |
| I596 | F3 |
| I597 | F3 |
| I598 | E3 |

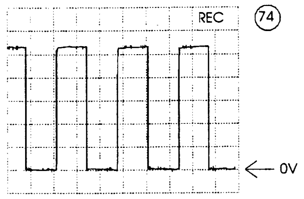
## Oscillograms Deck Electronics



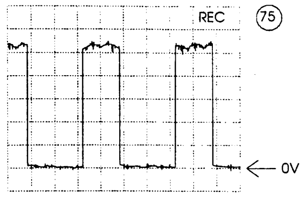
(71)
A: DC, 1 V/Div, 200ms/Div
IC 7406 Pin 6/7



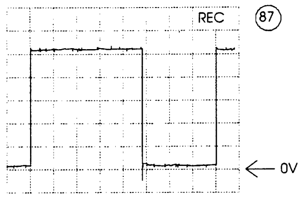
(72)
A: DC, 1 V/Div, 20ms/Div
IC 7406 Pin 3



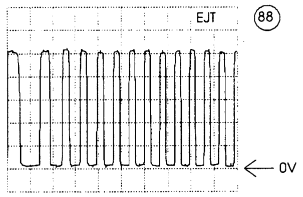
(74)
A: DC, 1 V/Div, 500us/Div
IC 7406 Pin 32



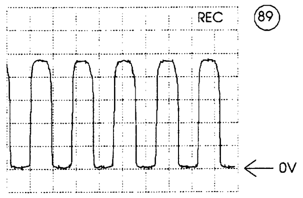
(75)
A: DC, 1 V/Div, 10ms/Div
IC 7406 Pin 27/42



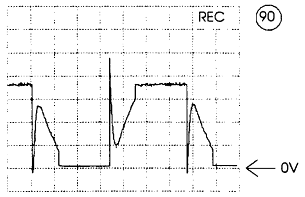
(87)
A: DC, 1 V/Div, 5ms/Div
IC 7443 Pin 2



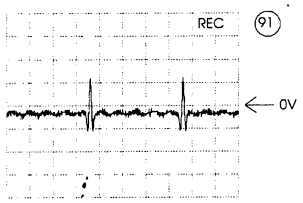
(88)
A: DC, 1 V/Div, 20ms/Div
IC 7443 Pin 5



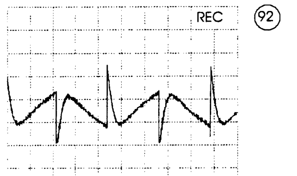
(89)
A: DC, 1 V/Div, 500ms/Div
IC 7443 Pin 6/7



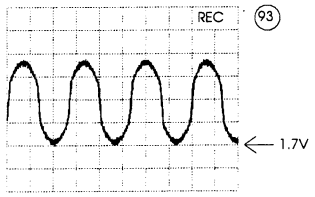
(90)
A: DC, 2 V/Div, 1ms/Div
Connector 1948 Pin 1/2/3



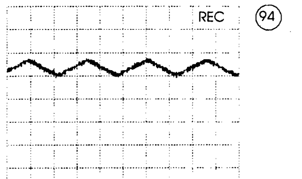
(91)
A: DC, 200mV/Div, 10ms/Div
Connector 1948 Pin 5



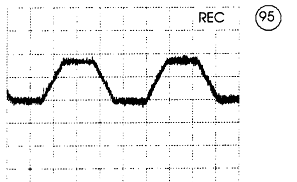
(92)
A: DC, 1 V/Div, 500us/Div
Connector 1948 Pin 4



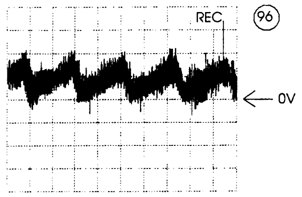
(93)
A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4



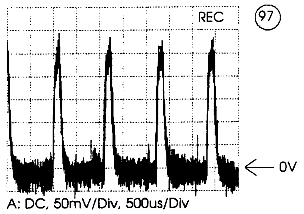
(94)
A: DC, 500mV/Div, 10us/Div
Connector 1946 Pin 6



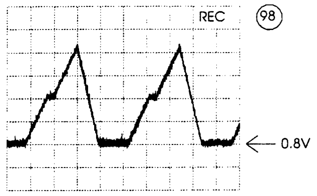
(95)
A: DC, 200mV/Div, 500us/Div
IC 7446 Pin 10



(96)
A: DC, 50mV/Div, 500us/Div
IC 7446 Pin 11



(97)
A: DC, 50mV/Div, 500us/Div
IC 7446 Pin 12



(98)
A: AC, 200mV/Div, 500us/Div
IC 7446 Pin 9

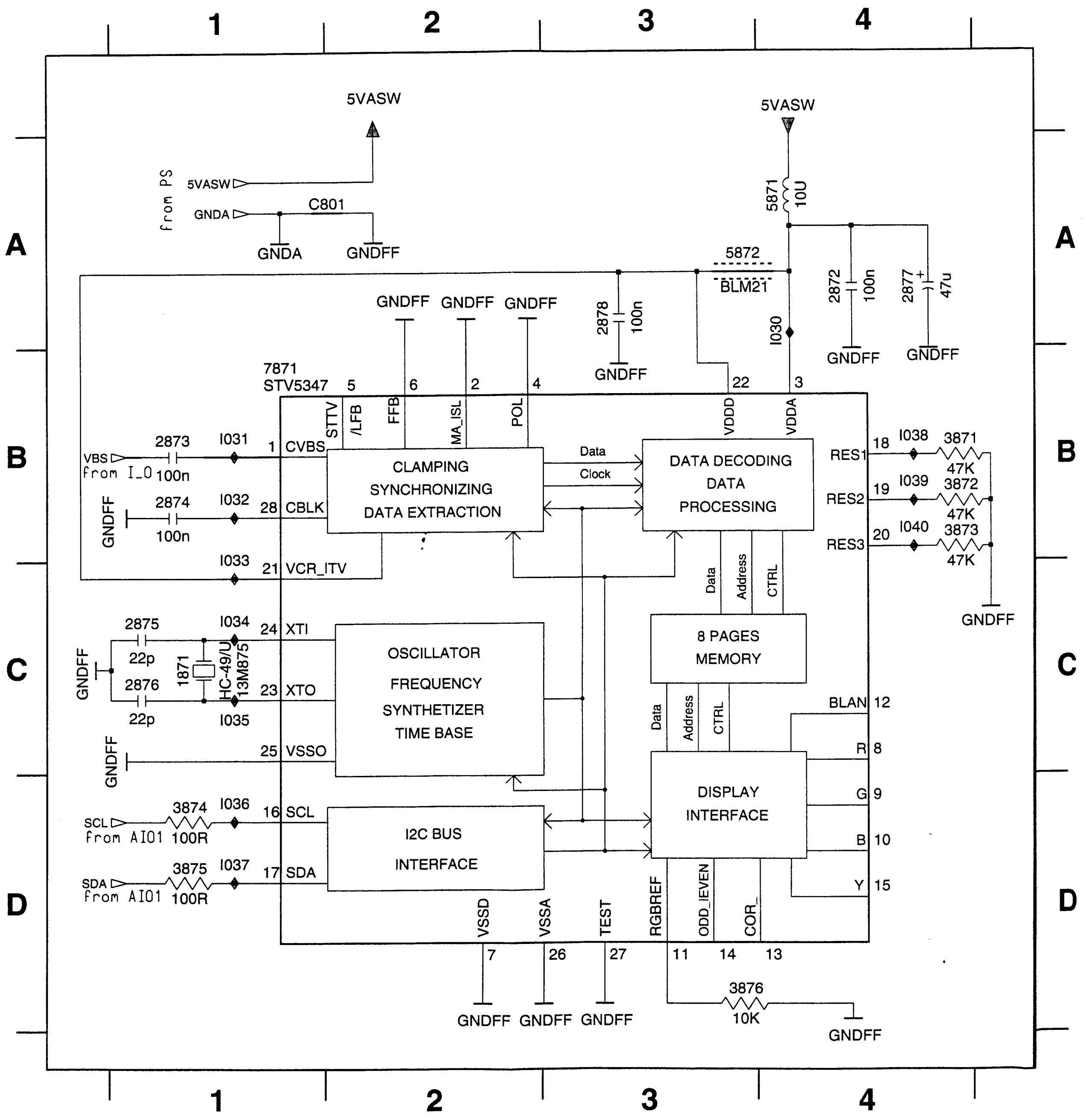
**Interconnections Manual Page**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF | 3-26 | AIO2 | 3-41 | CNR | 3-36 | DE | 3-42 | FF | 3-43 | FOME | 3-44 | HA | 3-32 | PE | 3-40 | QNIC | 3-46 | VS | 3-31 |
| AIO1 | 3-38 | AL | 3-28 | DC | 3-48 | ER | 3-27 | FM_STEREO | 3-25 | FV | 3-24 | I_O | 3-37 | PS | 3-22 | VPO | 3-45 | VS_SEC | 3-35 |

---

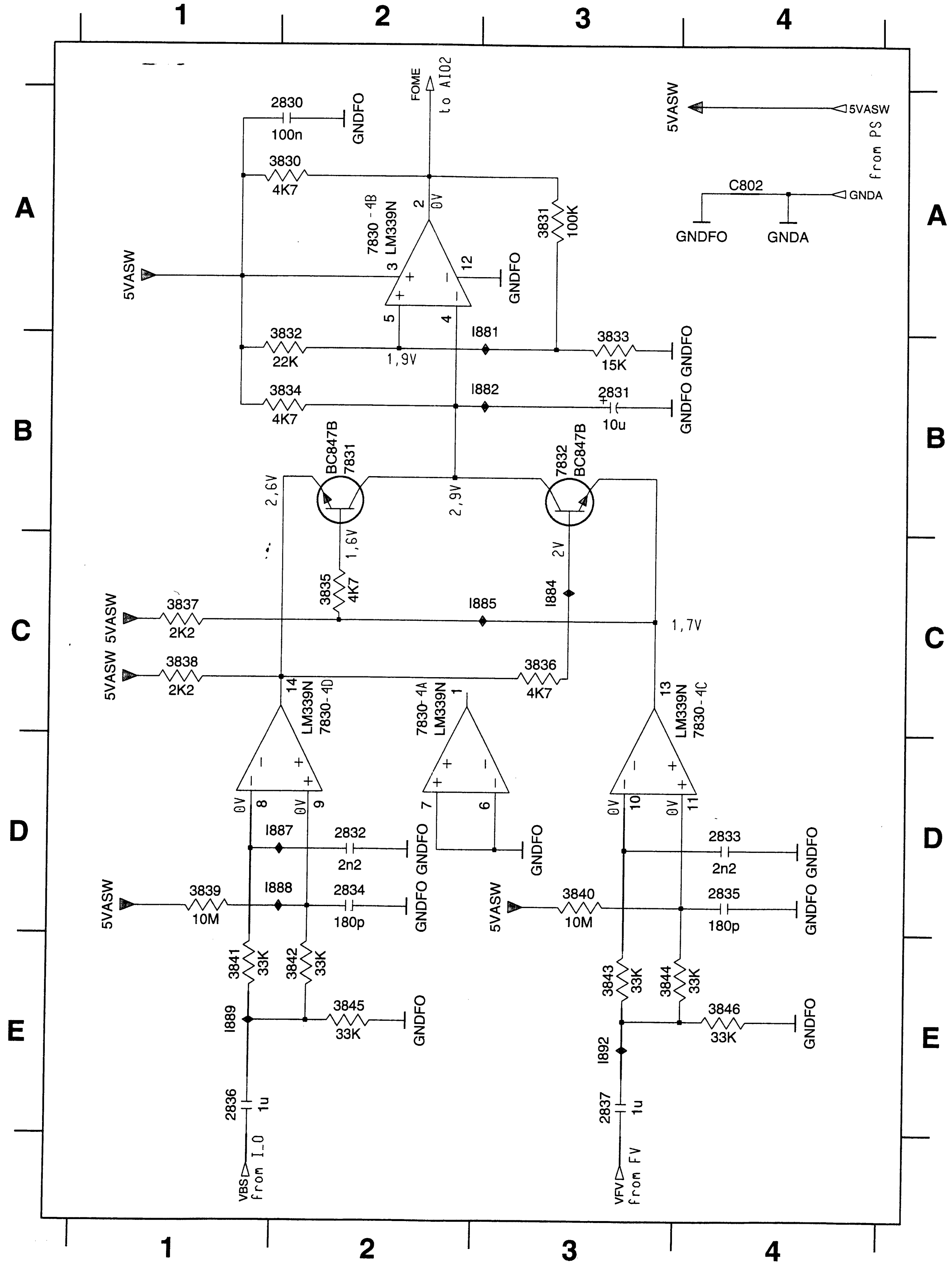
## Text Data Slicer (FF)

| | |
|---|---|
| 1871 | C1 |
| 2872 | A4 |
| 2873 | B1 |
| 2874 | B1 |
| 2875 | C1 |
| 2876 | C1 |
| 2877 | A4 |
| 2878 | A3 |
| 3871 | B4 |
| 3872 | B4 |
| 3873 | B4 |
| 3874 | D1 |
| 3875 | D1 |
| 3876 | D3 |
| 5871 | A4 |
| 5872 | A3 |
| 7871 | B1 |
| C801 | A2 |
| I030 | A4 |
| I031 | B1 |
| I032 | B1 |
| I033 | B1 |
| I034 | C1 |
| I035 | C1 |
| I036 | D1 |
| I037 | D1 |
| I038 | B4 |
| I039 | B4 |
| I040 | B4 |

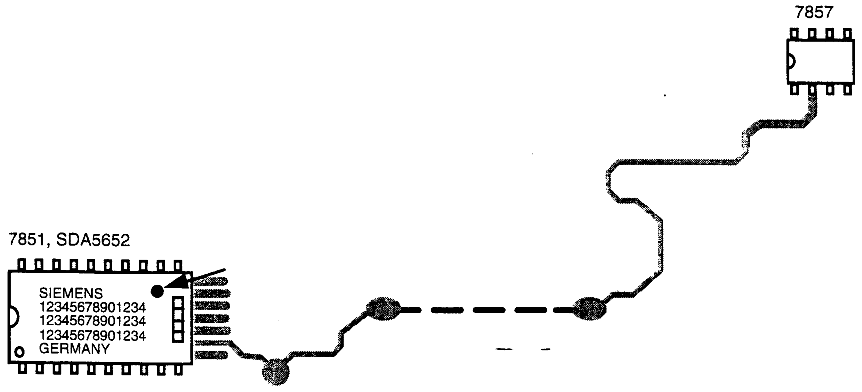

1
2
3
4
A
B
C
D
5VASW
5VASW
from PS
5VASW
GNDA
C801
GNDA
GNDFF
5871
10U
5872
BLM21
2872
100n
2877
47u
GNDFF
GNDFF
GNDFF
GNDFF
GNDFF
2878
100n
GNDFF
I030
7871
STV5347
STTV
/LFB
FFB
MA_ISL
POL
VDDD
VDDA
VBS
from I_O
2873
100n
I031
1 CVBS
2874
100n
I032
28 CBLK
I033
21 VCR_ITV
CLAMPING
SYNCHRONIZING
DATA EXTRACTION
Data
Clock
DATA DECODING
DATA
PROCESSING
RES1 18
RES2 19
RES3 20
I038
I039
I040
3871
47K
3872
47K
3873
47K
GNDFF
Data
Address
CTRL
8 PAGES
MEMORY
2875
22p
2876
22p
1871
HC-49/U
13M875
I034
24 XTI
I035
23 XTO
25 VSSO
OSCILLATOR
FREQUENCY
SYNTHETIZER
TIME BASE
BLAN 12
R 8
G 9
B 10
Y 15
DISPLAY
INTERFACE
SCL
from AI01
3874
100R
I036
16 SCL
SDA
from AI01
3875
100R
I037
17 SDA
I2C BUS
INTERFACE
VSSD
VSSA
TEST
RGBREF
ODD_/EVEN
COR_
7
26
27
11
14
13
3876
10K
GNDFF
GNDFF
GNDFF
GNDFF

## Follow Me Part (FOME)

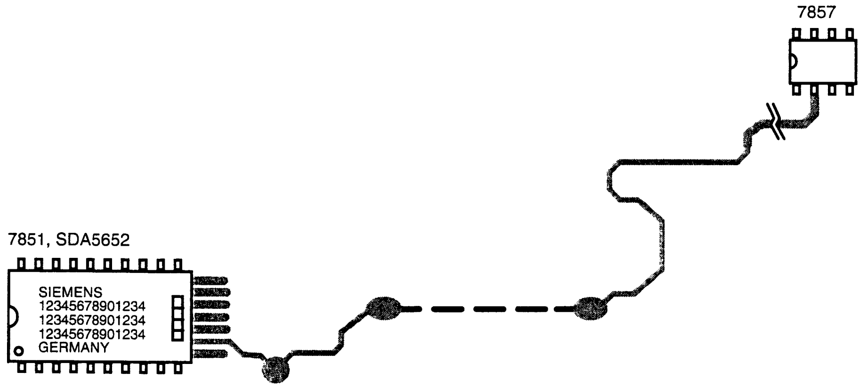
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2830 A2 | 2834 D2 | 3830 A2 | 3834 B2 | 3838 C1 | 3842 E2 | 3846 E4 | 7830 D4 | 1881 A3 | 1887 D2 |
| 2831 B3 | 2835 D4 | 3831 A3 | 3835 C2 | 3839 D1 | 3843 E3 | 7830 A2 | 7831 B2 | 1882 B3 | 1888 D2 |
| 2832 D2 | 2836 E1 | 3832 B2 | 3836 C3 | 3840 D3 | 3844 E3 | 7830 D2 | 7832 B3 | 1884 C3 | 1889 E1 |
| 2833 D4 | 2837 E3 | 3833 B3 | 3837 C1 | 3841 E1 | 3845 E2 | 7830 D2 | C802 A4 | 1885 C3 | 1892 E3 |


1
2
3
4
A
B
C
D
E
FOME to AI02
2830
100n
GNDFO
3830
4K7
5VASW
7830-4B LM339N
0V
3831 100K
C802
GNDA
GNDFO
5VASW from PS
3832
22K
1,9V
1881
3833
15K
3834
4K7
1882
2831
10u
BC847B 7831
7832 BC847B
2,6V
2,9V
1,6V
2V
3835 4K7
1884
1885
3837
2K2
3838
2K2
3836
4K7
1,7V
LM339N 7830-4D
7830-4A LM339N
LM339N 7830-4C
1887
2832
2n2
1888
2834
180p
3839
10M
3840
10M
2833
2n2
2835
180p
3841 33K
3842 33K
3843 33K
3844 33K
3845
33K
3846
33K
1889
1892
2836 1u
2837 1u
VBS from I.O
VFV from FV

---


7857
7851, SDA5652
SIEMENS
12345678901234
12345678901234
12345678901234
GERMANY

*Picture 1*
*SDA5652 Version 1* (for OSD Version identification see also Service Test Program Step 0)


7857
7851, SDA5652
SIEMENS
12345678901234
12345678901234
12345678901234
GERMANY

*Picture 2*
*SDA5652 Version 1 replaced by Version 2*

## GB Replacing position 7851, SDA5652

If an IC7851 identified with a dot (Version 1) as shown in picture 1 has been fitted in the set, and if a version without a dot (Version 2) is supplied as a replacement part, the following modifications have to be done:

- The circuit board conductor from pin 2 on 7857 to pin 7 on 7851 must be interrupted, as in picture 2.

## D Tausch von Position 7851, SDA5652

Wenn im Gerät ein IC7851 mit Punkt als Kennzeichnung (Version 1) wie in Bild 1 eingebaut ist und als Ersatzteil erhält man eine Version ohne Punkt (Version 2), sind folgende Modifikationen notwendig:

- Leiterbahn von Pin 2 von 7857 zu Pin 7 von 7851 unterbrechen wie in Bild 2.

## F Remplacement de position 7851, SDA5652

Si un CI7851 marqué d'un point (Version 1) se trouve dans l'appareil et si on vous a donné une version sans point (Version 2) comme pièce de rechange, les modifications suivantes doivent être apportées:

- interrompre la piste reliant la broche 2 du 7857 à la broche 7 du 7851 comme indiqué en figure 2.

## NL Wisselen van positie 7851, SDA5652

Als er in het toestel een IC7851 met een punt als kenmerk (Version 1) zoals in afb. 1 ingebouwd is en als reserveonderdeel krijgt u een versie zonder punt (Version 2), moeten volgende modificaties worden uitgevoerd:

- printbaan van pin 2 van 7857 naar pin 7 van 7851 onderbreken zoals op afb. 2

## E Sostituzione di pos. 7851, SDA5652

Se nell'apparecchio è presente un IC7851 contrassegnato da un punto (Version 1), come raffigurato in figura 1, ed in sostituzione si riceve una versione priva del punto (Version 2), occorre apportare le seguenti modifiche:

- interrompere il collegamento dal pin 2 di 7857 al pin 7 di 7851, come in figura 2.

## I Cambio de pos. 7851, SDA5652

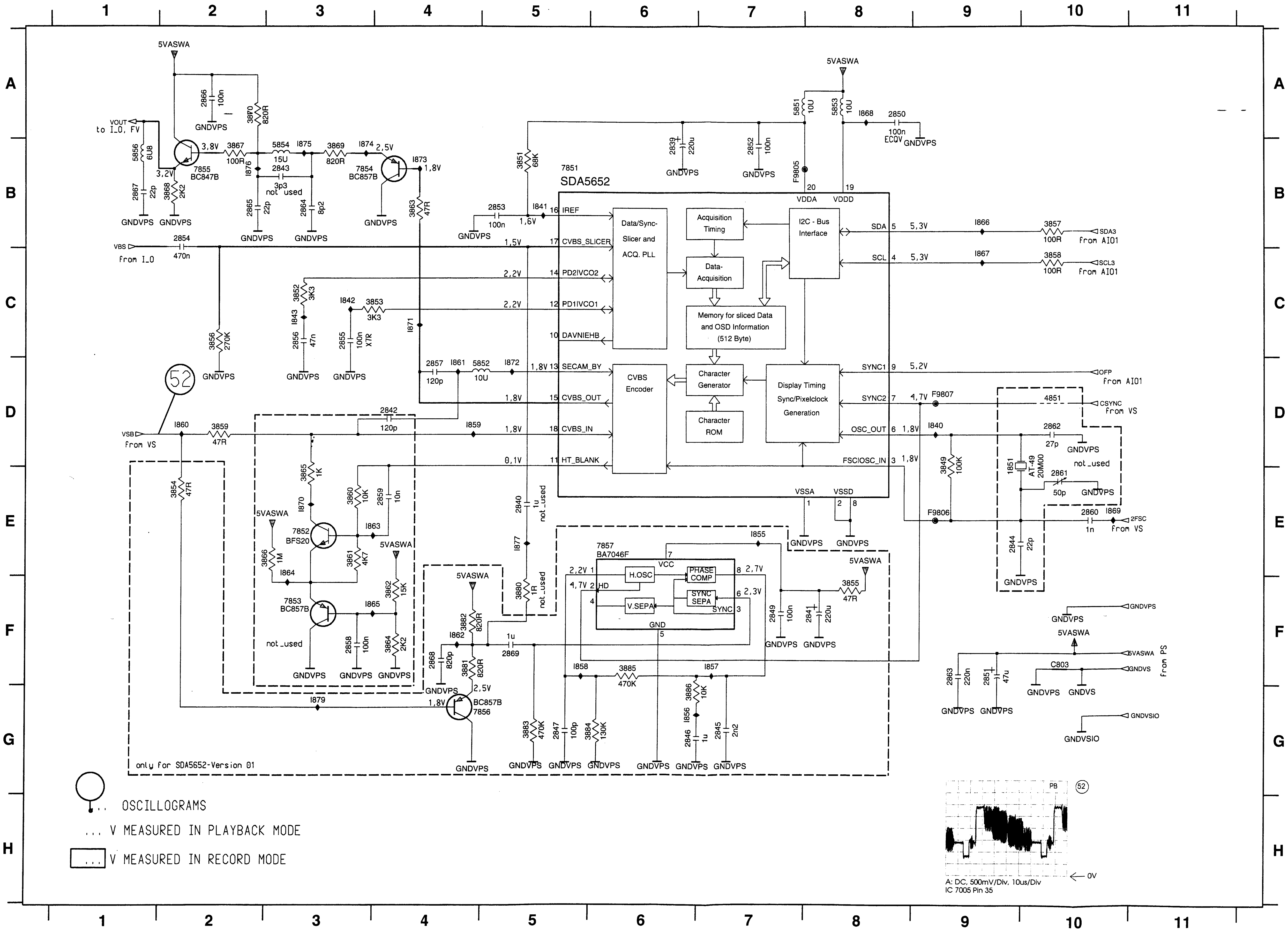
Si está instalado en el equipo un CI 7851 con un punto como identificación (Version 1), segun la Fig.1 , y la pieza de recambio suministrada es una versión sin punto (Version 2), es necesario efectuar las siguientes modificaciones:

- interrumpir el conductor impreso de pin 2 de 7857 a Pin 7 de 7851 según muestra Fig. 2.

# VPS/PDC & OSD Part (VPO)

**Interconnections Manual Page**

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF | 3-26 | AIO2 | 3-41 | CNR | 3-36 | DE | 3-42 | FF | 3-43 | FOME | 3-44 | HA | 3-32 | PE | 3-40 | QNIC | 3-46 | VS | 3-31 |
| AIO1 | 3-38 | AL | 3-28 | DC | 3-48 | ER | 3-27 | FM_STEREO | 3-25 | FV | 3-24 | I_O | 3-37 | PS | 3-22 | VPO | 3-45 | VS_SEC | 3-35 |



1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
5VASWA
2866 100n
GNDVPS
3870 820R
VOUT to I_O, FV
5856 6U8
7855 BC847B
3,8V
3,2V
3867 100R
5854 15U
1875
3869 820R
1874 2,5V
7854 BC857B
1873 1,8V
1876
2843 3p3 not used
2867 22p
3868 2K2
2865 22p
2864 8p2
3863 47R
VBS from I_O
2854 470n
3856 270K
3852 3K3
1843
2856 47n
1842
3853 3K3
2855 100n X7R
1871
52
VSB from VS
1860
3859 47R
3854 47R
2857 120p
1861
5852 10U
1872
2842 120p
1859
3865 1K
1870
3860 10K
2859 10n
1863
7852 BFS20
3866 1M
1864
3861 4K7
7853 BC857B
1865
3862 15K
not_used
2858 100n
3864 2K2
5VASWA
3882 820R
1862
2868 820p
3881 820R
2869 1u
2,5V
1879
1,8V
7856 BC857B
2853 100n
1841 1,6V
3851 68K
7851
SDA5652
16 IREF
17 CVBS_SLICER
14 PD2IVCO2
12 PD1IVCO1
10 DAVNIEHB
13 SECAM_BY
15 CVBS_OUT
18 CVBS_IN
11 HT_BLANK
1,5V
2,2V
2,2V
1,8V
1,8V
1,8V
0,1V
Data/Sync-Slicer and ACQ. PLL
Acquisition Timing
Data-Acquisition
Memory for sliced Data and OSD Information (512 Byte)
I2C - Bus Interface
CVBS Encoder
Character Generator
Character ROM
Display Timing Sync/Pixelclock Generation
2839 220u
2852 100n
5851 10U
5853 10U
1868
2850 100n ECQV
F9805
20 VDDA
19 VDDD
SDA 5 5,3V
SCL 4 5,3V
SYNC1 9 5,2V
SYNC2 7 4,7V
OSC_OUT 6 1,8V
FSCIOSC_IN 3 1,8V
VSSA 1
VSSD 2 8
1866
3857 100R
SDA3 from AIO1
1867
3858 100R
SCL3 from AIO1
OFP from AIO1
F9807
4851
CSYNC from VS
1840
2862 27p
3849 100K
1851 AT-49 20M00
not_used
2861 50p
F9806
2860 1n
1869
2FSC from VS
2844 22p
2840 1u not_used
1877
3880 1R not_used
1855
7857 BA7046F
VCC 7
2,2V 1
4,7V 2 HD
4
H.OSC
V.SEPA
PHASE COMP
SYNC SEPA
SYNC 3
8 2,7V
6 2,3V
GND 5
3855 47R
2849 100n
2841 220u
1858
3885 470K
1857
3886 10K
1856
3883 470K
2847 100p
3884 130K
2846 1u
2845 2n2
only for SDA5652-Version 01
GNDVPS
5VASWA
C803
GNDVS
from PS
2863 220n
2851 47u
GNDVSIO
PB
A: DC, 500mV/Div, 10us/Div
IC 7005 Pin 35
0V

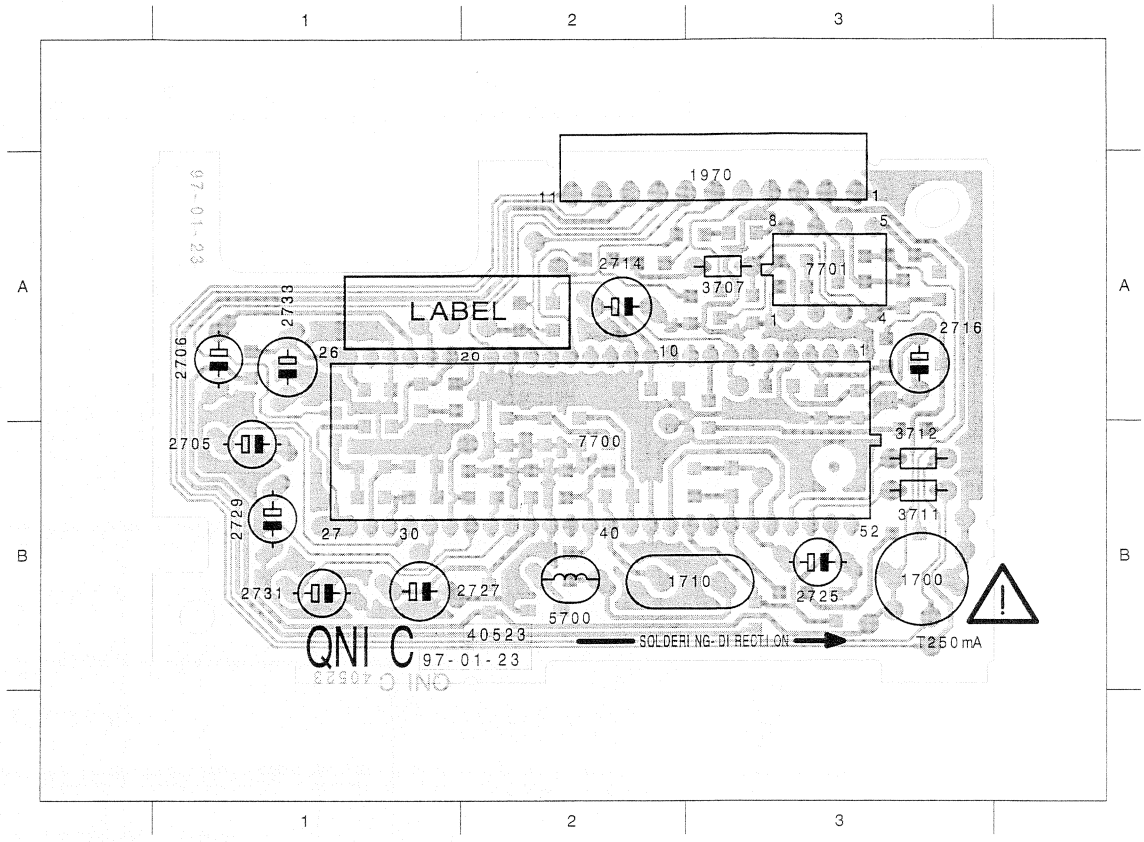
OSCILLOGRAMS

... V MEASURED IN PLAYBACK MODE

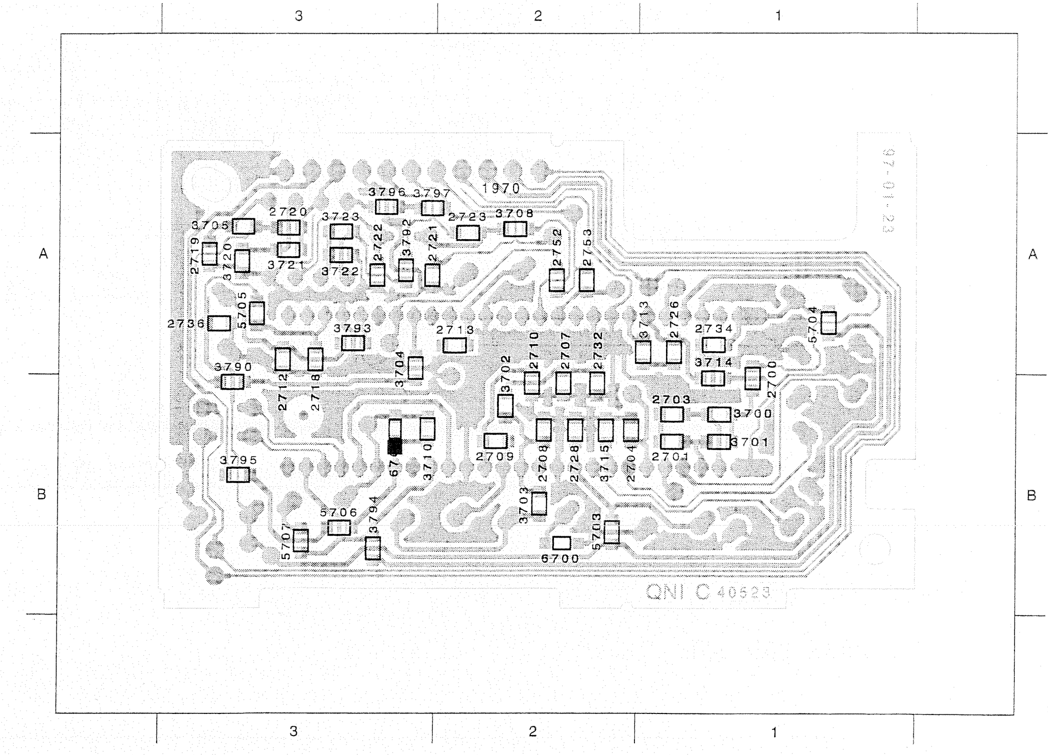
... V MEASURED IN RECORD MODE

| | |
|---|---|
| 1851 | D9 |
| 2839 | B6 |
| 2840 | E5 |
| 2841 | F8 |
| 2842 | D4 |
| 2843 | B3 |
| 2844 | E9 |
| 2845 | G7 |
| 2846 | G6 |
| 2847 | G5 |
| 2849 | F7 |
| 2850 | A8 |
| 2851 | F9 |
| 2852 | B7 |
| 2853 | B5 |
| 2854 | B2 |
| 2855 | C3 |
| 2856 | C3 |
| 2857 | D4 |
| 2858 | F3 |
| 2859 | E4 |
| 2860 | E10 |
| 2861 | E10 |
| 2862 | D10 |
| 2863 | F9 |
| 2864 | B3 |
| 2865 | B2 |
| 2866 | A2 |
| 2867 | B1 |
| 2868 | F4 |
| 2869 | F5 |
| 3849 | D9 |
| 3851 | B5 |
| 3852 | C3 |
| 3853 | C3 |
| 3854 | E2 |
| 3855 | F8 |
| 3856 | C2 |
| 3857 | B10 |
| 3858 | C10 |
| 3859 | D2 |
| 3860 | E3 |
| 3861 | E3 |
| 3862 | F4 |
| 3863 | B4 |
| 3864 | F4 |
| 3865 | E3 |
| 3866 | E3 |
| 3867 | B2 |
| 3868 | B2 |
| 3869 | B3 |
| 3870 | A2 |
| 3880 | F5 |
| 3881 | F4 |
| 3882 | F4 |
| 3883 | G5 |
| 3884 | G6 |
| 3885 | F6 |
| 3886 | G6 |
| 4851 | D10 |
| 5851 | A7 |
| 5852 | D4 |
| 5853 | A8 |
| 5854 | B3 |
| 5856 | B1 |
| 7851 | B5 |
| 7852 | E3 |
| 7853 | F3 |
| 7854 | B3 |
| 7855 | B2 |
| 7856 | G4 |
| 7857 | E6 |
| C803 | F10 |
| F9805 | B7 |
| F9806 | E9 |
| F9807 | D9 |
| 1840 | D9 |
| 1841 | B5 |
| 1842 | C3 |
| 1843 | C3 |
| 1855 | E7 |
| 1856 | G6 |
| 1857 | F7 |
| 1858 | F5 |
| 1859 | D4 |
| 1860 | D2 |
| 1861 | D4 |
| 1862 | F4 |
| 1863 | E3 |
| 1864 | E3 |
| 1865 | F3 |
| 1866 | B9 |
| 1867 | C9 |
| 1868 | A8 |
| 1869 | E10 |
| 1870 | E3 |
| 1871 | C4 |
| 1872 | D5 |
| 1873 | B4 |
| 1874 | B3 |
| 1875 | B3 |
| 1876 | B2 |
| 1877 | E5 |
| 1879 | G3 |

## Nicam Board (QNIC)

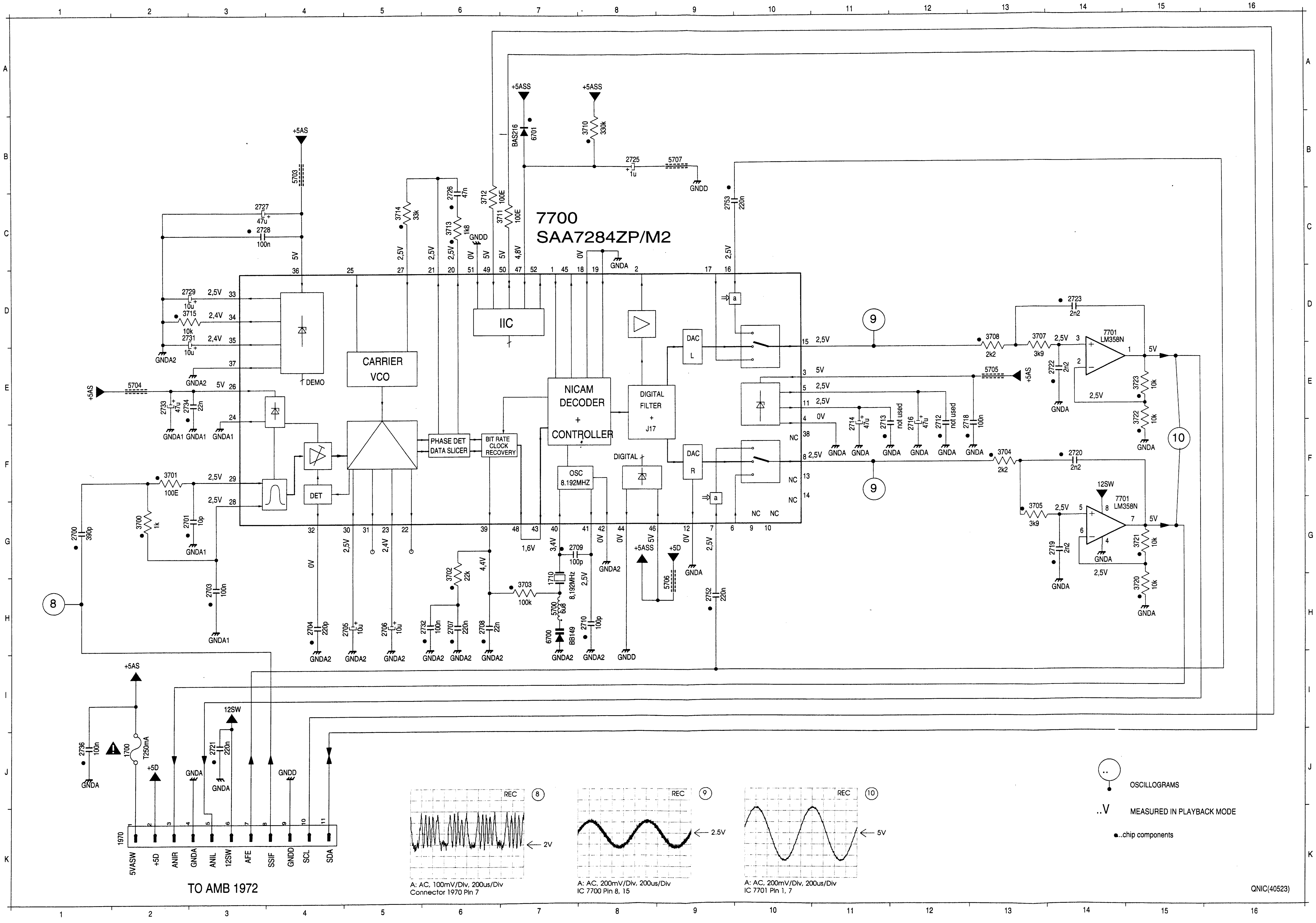

1
2
3
A
B
1970
11
1
8
5
2714
3707
7701
4
LABEL
2733
2706
26
20
10
2716
2705
7700
3712
3711
2729
27
30
40
52
2731
2727
5700
1710
2725
1700
QNI C
40523
97-01-23
SOLDERI NG- DI RECTI ON
T250mA

| | | |
|---|---|---|
| 1700 | B | 3 |
| 1710 | B | 3 |
| 1970 | A | 3 |
| 2705 | B | 1 |
| 2706 | A | 1 |
| 2714 | A | 2 |
| 2716 | A | 3 |
| 2725 | B | 3 |
| 2727 | B | 1 |
| 2729 | B | 1 |
| 2731 | B | 1 |
| 2733 | A | 1 |
| 3707 | A | 3 |
| 3711 | B | 3 |
| 3712 | B | 3 |
| 5700 | B | 2 |
| 7700 | B | 2 |
| 7701 | A | 3 |


3
2
1
A
B
1970
3796
3797
2720
3723
2723
3708
3705
2719
3720
3721
3722
2722
3792
2721
2752
2753
2736
5705
3793
2713
3704
2710
2707
2732
3713
2726
2734
3714
2700
5704
3790
2712
2718
3702
2703
3700
3701
2709
2708
2728
3715
2704
2701
67
3710
3795
5706
3794
5707
3703
6700
5703
QNI C 40523
97-01-23

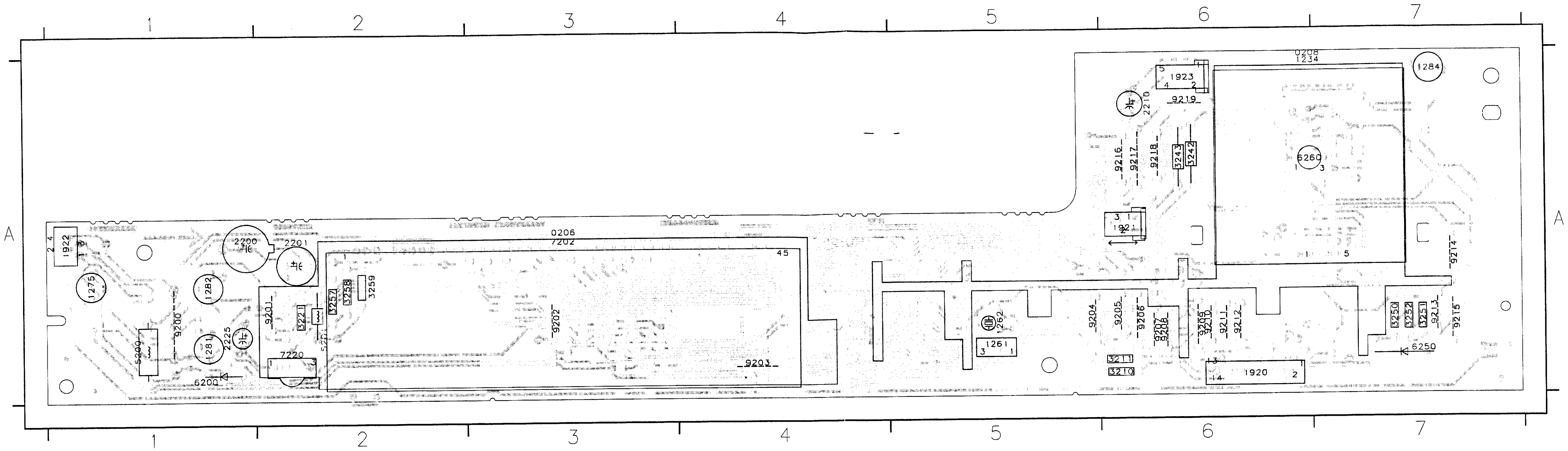
| | | |
|---|---|---|
| 2700 | B | 1 |
| 2701 | B | 1 |
| 2703 | B | 1 |
| 2704 | B | 2 |
| 2707 | B | 2 |
| 2708 | B | 2 |
| 2709 | B | 2 |
| 2710 | B | 2 |
| 2712 | A | 3 |
| 2713 | A | 2 |
| 2718 | A | 3 |
| 2719 | A | 3 |
| 2720 | A | 3 |
| 2721 | A | 3 |
| 2722 | A | 3 |
| 2723 | A | 2 |
| 2726 | A | 1 |
| 2728 | B | 2 |
| 2732 | B | 2 |
| 2734 | A | 1 |
| 2736 | A | 3 |
| 2752 | A | 2 |
| 2753 | A | 2 |
| 3700 | B | 1 |
| 3701 | B | 1 |
| 3702 | B | 2 |
| 3703 | B | 2 |
| 3704 | A | 3 |
| 3705 | A | 3 |
| 3708 | A | 2 |
| 3710 | B | 3 |
| 3713 | A | 1 |
| 3714 | B | 1 |
| 3715 | B | 2 |
| 3720 | A | 3 |
| 3721 | A | 3 |
| 3722 | A | 3 |
| 3723 | A | 3 |
| 3790 | B | 3 |
| 3792 | A | 3 |
| 3793 | A | 3 |
| 3794 | B | 3 |
| 3795 | B | 3 |
| 3796 | A | 3 |
| 3797 | A | 3 |
| 5703 | B | 2 |
| 5704 | A | 1 |
| 5705 | A | 3 |
| 5706 | B | 3 |
| 5707 | B | 3 |
| 6700 | B | 2 |
| 6701 | B | 3 |

# Nicam Board (QNIC)

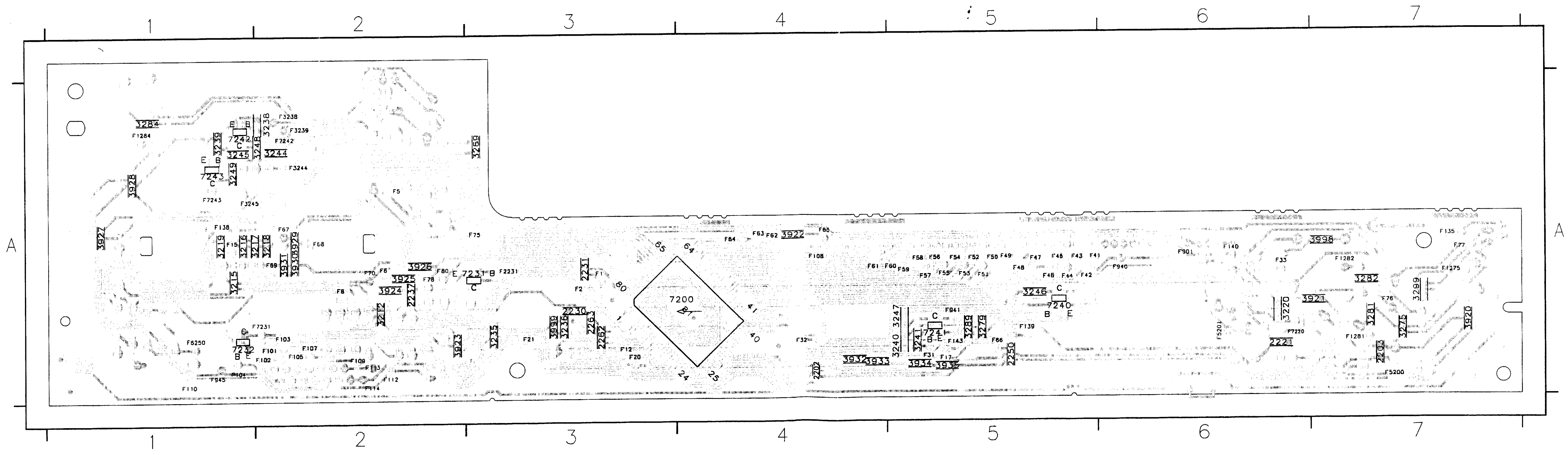

7700
SAA7284ZP/M2
IIC
CARRIER VCO
NICAM DECODER + CONTROLLER
DIGITAL FILTER + J17
DAC L
DAC R
PHASE DET DATA SLICER
BIT RATE CLOCK RECOVERY
OSC 8.192MHZ
DET
DEMO
DIGITAL
7701 LM358N
1700 T250mA
1710 8,192MHz
6701 BAS216
6700 BB149
+5AS
+5ASS
+5D
12SW
GNDA
GNDA1
GNDA2
GNDD
9
10
8
1970
5VASW
+5D
ANIR
GNDA
ANIL
12SW
AFE
SSIF
GNDD
SCL
SDA
TO AMB 1972
REC
2V
2.5V
5V
A: AC, 100mV/Div, 200us/Div
Connector 1970 Pin 7
A: AC, 200mV/Div, 200us/Div
IC 7700 Pin 8, 15
A: AC, 200mV/Div, 200us/Div
IC 7701 Pin 1, 7
OSCILLOGRAMS
..V MEASURED IN PLAYBACK MODE
●..chip components
QNIC(40523)

| | |
|---|---|
| 1700 | J 2 |
| 1710 | H 7 |
| 1970 | K 2 |
| 2700 | G 1 |
| 2701 | G 2 |
| 2703 | H 3 |
| 2704 | H 4 |
| 2705 | H 5 |
| 2706 | H 5 |
| 2707 | H 6 |
| 2708 | H 6 |
| 2709 | G 7 |
| 2710 | H 8 |
| 2712 | F12 |
| 2713 | F11 |
| 2714 | F11 |
| 2716 | F12 |
| 2718 | F12 |
| 2719 | G14 |
| 2720 | F14 |
| 2721 | J 3 |
| 2722 | E14 |
| 2723 | D14 |
| 2725 | B 8 |
| 2726 | C 6 |
| 2727 | C 3 |
| 2728 | C 3 |
| 2729 | D 2 |
| 2731 | D 2 |
| 2732 | H 6 |
| 2733 | E 2 |
| 2734 | E 2 |
| 2736 | J 1 |
| 2752 | H 9 |
| 2753 | C 9 |
| 3700 | G 2 |
| 3701 | F 2 |
| 3702 | G 6 |
| 3703 | H 7 |
| 3704 | F13 |
| 3705 | G13 |
| 3707 | D13 |
| 3708 | D13 |
| 3710 | B 8 |
| 3711 | C 7 |
| 3712 | C 6 |
| 3713 | C 6 |
| 3714 | C 5 |
| 3715 | D 3 |
| 3720 | H15 |
| 3721 | G15 |
| 3722 | E15 |
| 3723 | E15 |
| 5700 | H 7 |
| 5703 | B 4 |
| 5704 | E 2 |
| 5705 | E13 |
| 5706 | H 9 |
| 5707 | B 9 |
| 6700 | H 7 |
| 6701 | B 7 |
| 7700 | C 7 |
| 7701 | D14 |
| 7701 | G14 |

## Display Control ADCP3 (DC)

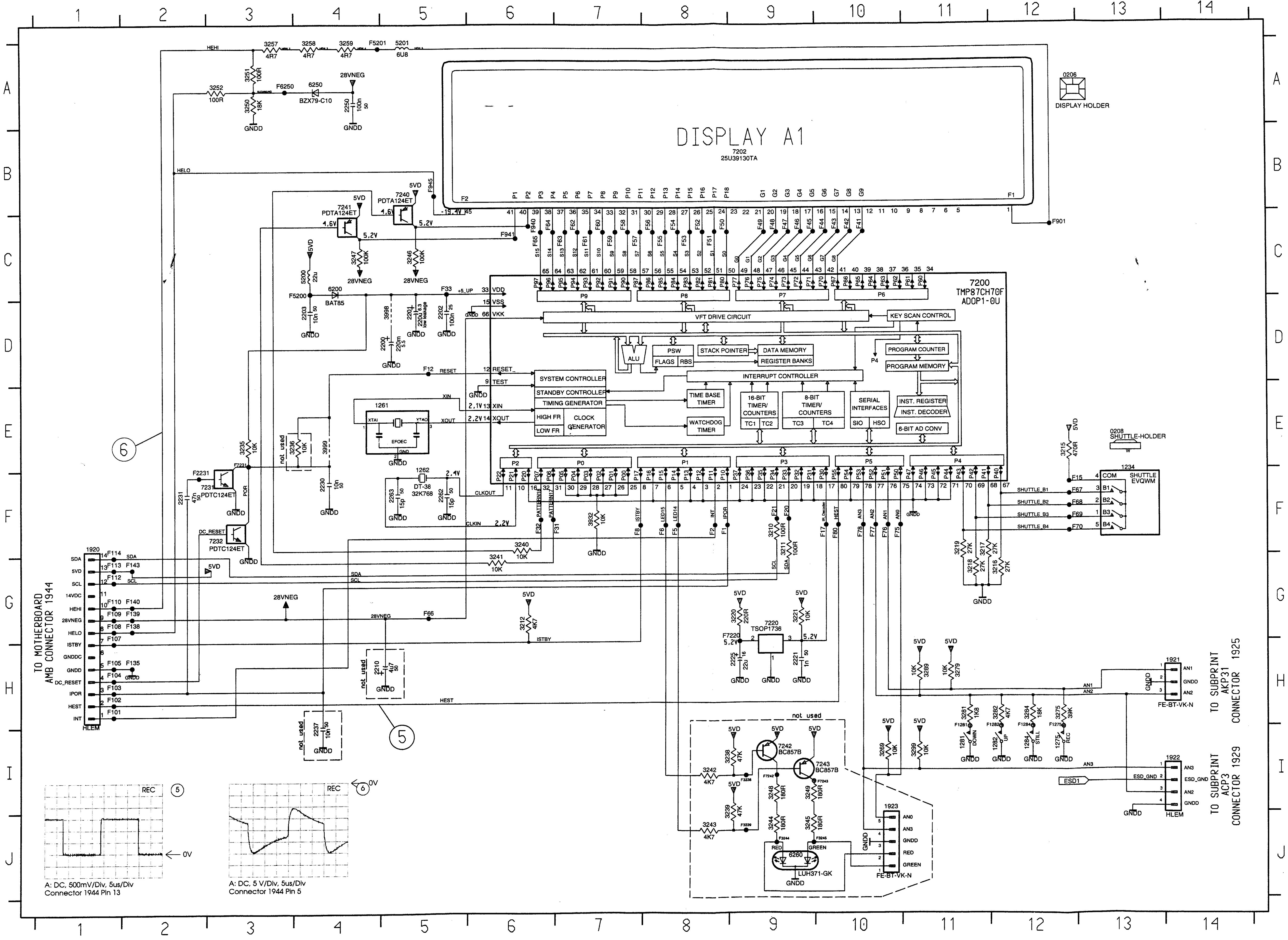

1
2
3
4
5
6
7
A
0208
1234
1923
1284
2210
9219
9216
9217
9218
3243
3242
6260
1921
9214
1922
1275
2200
2201
0206
7202
45
1282
9200
9201
3221
3257
3258
3259
9202
5200
1281
2225
7220
6200
9203
1262
1261
9204
9205
9206
9207
9208
9209
9210
9211
9212
3211
3210
1920
3250
3252
3251
9213
9215
6250

| | |
|---|---|
| 0206 | A3 |
| 0208 | A6 |
| 1234 | A6 |
| 1261 | A5 |
| 1262 | A5 |
| 1275 | A1 |
| 1281 | A1 |
| 1282 | A1 |
| 1284 | A7 |
| 1920 | A6 |
| 1921 | A6 |
| 1922 | A1 |
| 1923 | A6 |
| 2200 | A1 |
| 2201 | A2 |
| 2210 | A6 |
| 2225 | A1 |
| 3210 | A6 |
| 3211 | A6 |
| 3221 | A2 |
| 3242 | A6 |
| 3243 | A6 |
| 3250 | A7 |
| 3251 | A7 |
| 3252 | A7 |
| 3257 | A2 |
| 3258 | A2 |
| 3259 | A2 |
| 5200 | A1 |
| 5201 | A2 |
| 6200 | A1 |
| 6250 | A7 |
| 6260 | A6 |
| 7202 | A3 |
| 7220 | A2 |
| 9200 | A1 |
| 9201 | A2 |
| 9202 | A3 |
| 9203 | A4 |
| 9204 | A5 |
| 9205 | A6 |
| 9206 | A6 |
| 9207 | A6 |
| 9208 | A6 |
| 9209 | A6 |
| 9210 | A6 |
| 9211 | A6 |
| 9212 | A6 |
| 9213 | A7 |
| 9214 | A7 |
| 9215 | A7 |
| 9216 | A6 |
| 9217 | A6 |
| 9218 | A6 |
| 9219 | A6 |


1
2
3
4
5
6
7
A
3284
7242
3239
3245
3236
3248
3244
3249
7243
3928
3269
3927
3219
3216
3217
3218
3931
3930
3929
3215
3926
3925
3924
2237
7231
3212
7232
3923
3235
2231
3999
3236
2230
2263
2262
7200
3922
2202
3932
3933
3240
3247
3241
7241
3934
3289
3279
2250
3246
7240
3998
3220
2221
3921
3282
3281
3299
2203
3275
3920

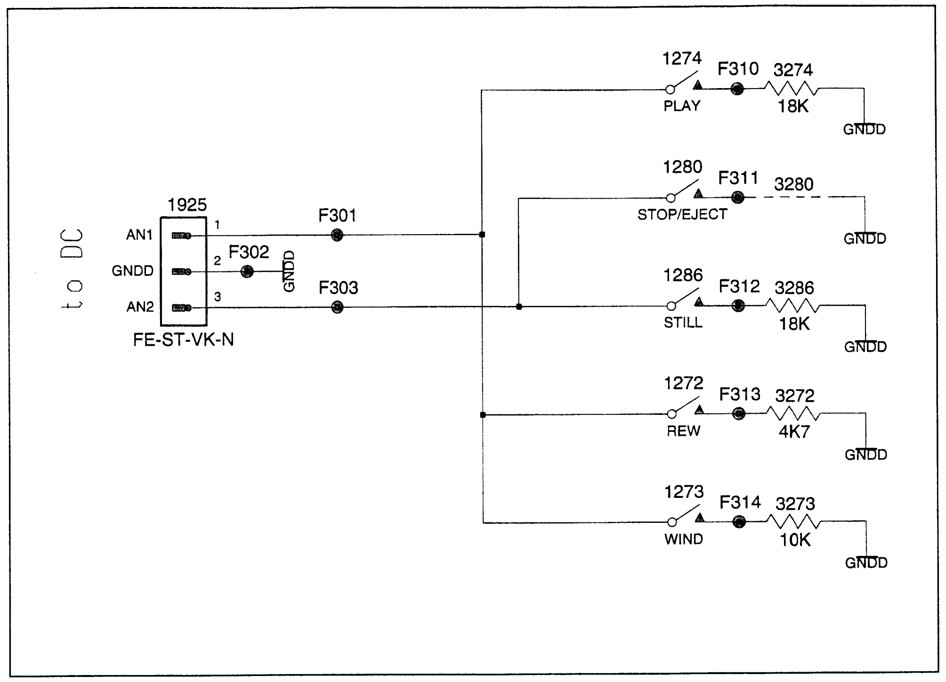
| | |
|---|---|
| 2202 | A4 |
| 2203 | A7 |
| 2221 | A6 |
| 2230 | A3 |
| 2231 | A3 |
| 2237 | A2 |
| 2250 | A5 |
| 2262 | A3 |
| 2263 | A3 |
| 3212 | A2 |
| 3215 | A1 |
| 3216 | A1 |
| 3217 | A1 |
| 3218 | A2 |
| 3219 | A1 |
| 3220 | A6 |
| 3235 | A3 |
| 3236 | A3 |
| 3238 | A2 |
| 3239 | A1 |
| 3240 | A5 |
| 3241 | A5 |
| 3244 | A2 |
| 3245 | A1 |
| 3246 | A5 |
| 3247 | A5 |
| 3248 | A2 |
| 3249 | A1 |
| 3269 | A3 |
| 3275 | A7 |
| 3279 | A5 |
| 3281 | A7 |
| 3282 | A7 |
| 3284 | A1 |
| 3289 | A5 |
| 3299 | A7 |
| 3920 | A7 |
| 3921 | A7 |
| 3922 | A4 |
| 3923 | A2 |
| 3924 | A2 |
| 3925 | A2 |
| 3926 | A2 |
| 3927 | A1 |
| 3928 | A1 |
| 3929 | A2 |
| 3930 | A2 |
| 3931 | A2 |
| 3999 | A3 |
| 7200 | A4 |
| 7231 | A3 |
| 7232 | A1 |
| 7240 | A5 |
| 7241 | A5 |
| 7242 | A1 |
| 7243 | A1 |

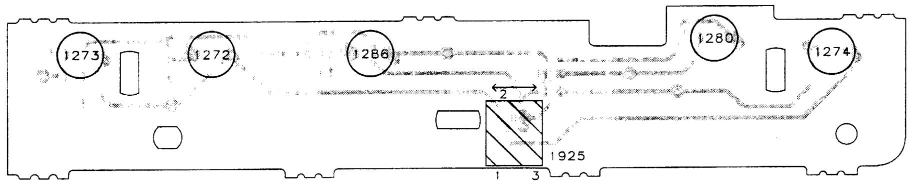
# Display Control ADCP3 (DC)

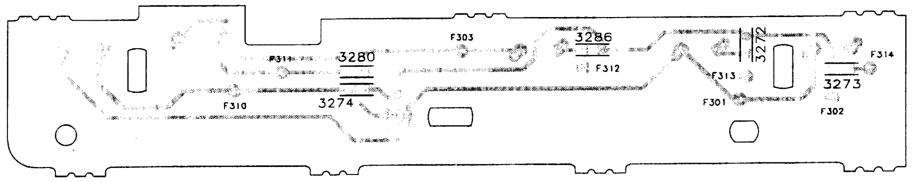

DISPLAY A1
7202
25U39130TA
0206
DISPLAY HOLDER
7200
TMP87CH70F
ADOP1-0U
VFT DRIVE CIRCUIT
KEY SCAN CONTROL
PSW
FLAGS
RBS
STACK POINTER
DATA MEMORY
REGISTER BANKS
ALU
PROGRAM COUNTER
PROGRAM MEMORY
INTERRUPT CONTROLLER
SYSTEM CONTROLLER
STANDBY CONTROLLER
TIMING GENERATOR
HIGH FR
LOW FR
CLOCK GENERATOR
TIME BASE TIMER
WATCHDOG TIMER
16-BIT TIMER/ COUNTERS
TC1
TC2
8-BIT TIMER/ COUNTERS
TC3
TC4
SERIAL INTERFACES
SIO
HSO
INST. REGISTER
INST. DECODER
6-BIT AD CONV
P0
P1
P2
P3
P4
P5
P6
P7
P8
P9
RESET
TEST
XIN
XOUT
VDD
VSS
VKK
1261
EFOEC
1262
DT-38
32K768
7240
PDTA124ET
7241
PDTA124ET
7231
PDTC124ET
7232
PDTC124ET
6250
BZX79-C10
6200
BAT85
28VNEG
5VD
GNDD
HEHI
HELO
1920
TO MOTHERBOARD
AMB CONNECTOR 1944
SDA
5VD
SCL
14VDC
HEHI
28VNEG
HELO
ISTBY
GNDDC
GNDD
DC_RESET
IPOR
HEST
INT
HLEM
0208
SHUTTLE-HOLDER
1234
SHUTTLE
EVQWM
COM
SHUTTLE_B1
SHUTTLE_B2
SHUTTLE_B3
SHUTTLE_B4
1921
AN1
GNDD
AN2
FE-BT-VK-N
TO SUBPRINT
AKP31
CONNECTOR 1925
1922
AN3
ESD_GND
AN2
GNDD
HLEM
TO SUBPRINT
ACP3
CONNECTOR 1929
ESD1
1281
DOWN
1282
UP
1284
STILL
1275
REC
7220
TSOP1736
7242
BC857B
7243
BC857B
6260
LUH371-GK
RED
GREEN
1923
AN0
AN3
GNDD
RED
GREEN
FE-BT-VK-N
not used
REC
⑤
⑥
0V
A: DC, 500mV/Div, 5us/Div
Connector 1944 Pin 13
A: DC, 5 V/Div, 5us/Div
Connector 1944 Pin 5
1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
J

| | |
|---|---|
| F1 | F8 |
| F2 | F8 |
| F5 | F8 |
| F6 | F8 |
| F8 | F7 |
| F12 | D5 |
| F15 | F12 |
| F17 | F10 |
| F20 | F9 |
| F21 | F9 |
| F31 | F7 |
| F32 | F6 |
| F33 | C5 |
| F41 | C10 |
| F42 | C10 |
| F43 | C10 |
| F44 | C10 |
| F45 | C9 |
| F46 | C9 |
| F47 | C9 |
| F48 | C9 |
| F49 | C9 |
| F50 | C8 |
| F51 | C8 |
| F52 | C8 |
| F53 | C8 |
| F54 | C8 |
| F55 | C8 |
| F56 | C8 |
| F57 | C7 |
| F58 | C7 |
| F59 | C7 |
| F60 | C7 |
| F61 | C7 |
| F62 | C7 |
| F63 | C7 |
| F64 | C6 |
| F65 | C6 |
| F66 | G5 |
| F67 | F12 |
| F68 | F12 |
| F69 | F12 |
| F70 | F12 |
| F75 | F10 |
| F76 | F10 |
| F77 | F10 |
| F78 | F10 |
| F80 | F10 |
| 0206 | A12 |
| 0208 | E13 |
| 1234 | F13 |
| 1261 | E4 |
| 1262 | F5 |
| 1275 | I12 |
| 1281 | I11 |
| 1282 | I12 |
| 1284 | I12 |
| 1920 | F1 |
| 1921 | H13 |
| 1922 | I13 |
| 1923 | I10 |
| 2200 | D5 |
| 2201 | D5 |
| 2202 | D5 |
| 2203 | D4 |
| 2210 | H4 |
| 2221 | H9 |
| 2225 | H9 |
| 2230 | F4 |
| 2231 | F2 |
| 2237 | I4 |
| 2250 | A4 |
| 2262 | F5 |
| 2263 | F5 |
| 3210 | F9 |
| 3211 | F9 |
| 3212 | G6 |
| 3215 | E12 |
| 3216 | G12 |
| 3217 | F11 |
| 3218 | G11 |
| 3219 | F11 |
| 3220 | G9 |
| 3221 | G9 |
| 3235 | E3 |
| 3236 | E3 |
| 3238 | I8 |
| 3239 | J8 |
| 3240 | F6 |
| 3241 | G6 |
| 3242 | I8 |
| 3243 | J8 |
| 3244 | J9 |
| 3245 | J9 |
| 3246 | C5 |
| 3247 | C4 |
| 3248 | I9 |
| 3249 | I9 |
| 3250 | A3 |
| 3251 | A3 |
| 3252 | A3 |
| 3257 | A3 |
| 3258 | A4 |
| 3259 | A4 |
| 3269 | I10 |
| 3275 | H12 |
| 3279 | H11 |
| 3281 | H11 |
| 3282 | H12 |
| 3284 | H12 |
| 3289 | H11 |
| 3299 | I11 |
| 3932 | F7 |
| 3998 | D5 |
| 3999 | E4 |
| 5200 | C4 |
| 5201 | A5 |
| 6200 | C4 |
| 6250 | A4 |
| 6260 | J9 |
| 7200 | C11 |
| 7202 | B9 |
| 7220 | G9 |
| 7231 | F2 |
| 7232 | F3 |
| 7240 | B5 |
| 7241 | B4 |
| 7242 | I9 |
| 7243 | I9 |
| ESD1 | I12 |
| F101 | H1 |
| F102 | H1 |
| F103 | H1 |
| F104 | H1 |
| F105 | H1 |
| F107 | G1 |
| F108 | G1 |
| F109 | G1 |
| F110 | G1 |
| F112 | G1 |
| F113 | G1 |
| F114 | F1 |
| F1275 | I12 |
| F1281 | I11 |
| F1282 | I12 |
| F1284 | I12 |
| F135 | H2 |
| F138 | G2 |
| F139 | G2 |
| F140 | G2 |
| F143 | G2 |
| F2231 | F2 |
| F3238 | I9 |
| F3239 | J9 |
| F3244 | J9 |
| F3245 | J10 |
| F5200 | C4 |
| F5201 | A4 |
| F6250 | A3 |
| F7220 | G9 |
| F7231 | E3 |
| F7242 | I9 |
| F7243 | I10 |
| F901 | C12 |
| F940 | C6 |
| F941 | C6 |
| F945 | B5 |

## Keyboard PCB AKP31

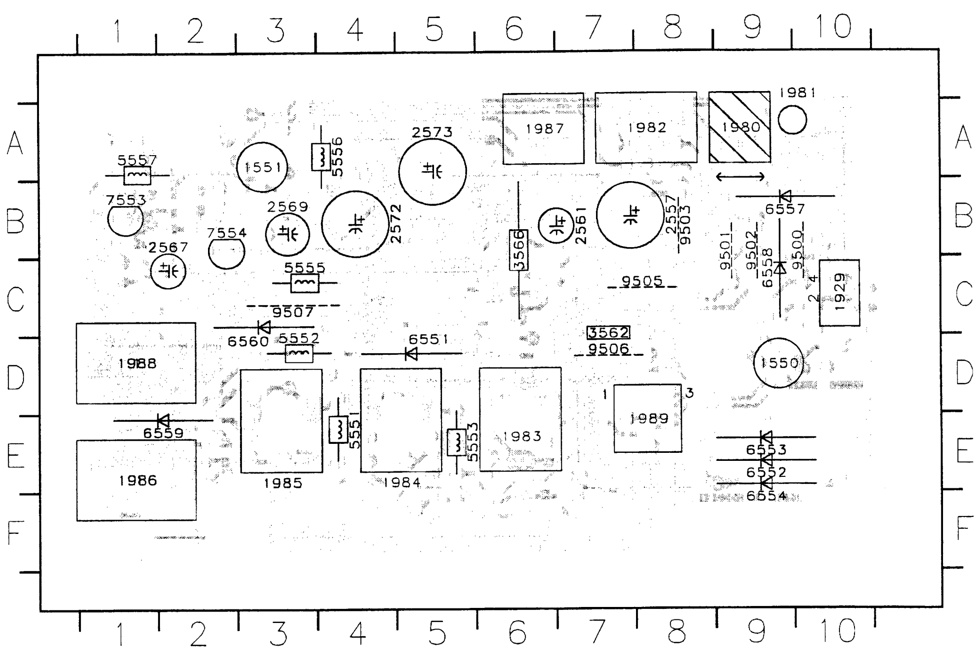

to DC
1925
AN1
GNDD
AN2
1
2
3
FE-ST-VK-N
F301
F302
F303
GNDD
1274
F310
3274
PLAY
18K
1280
F311
3280
STOP/EJECT
1286
F312
3286
STILL
18K
1272
F313
3272
REW
4K7
1273
F314
3273
WIND
10K
GNDD


1273
1272
1286
1280
1274
1925
1
3

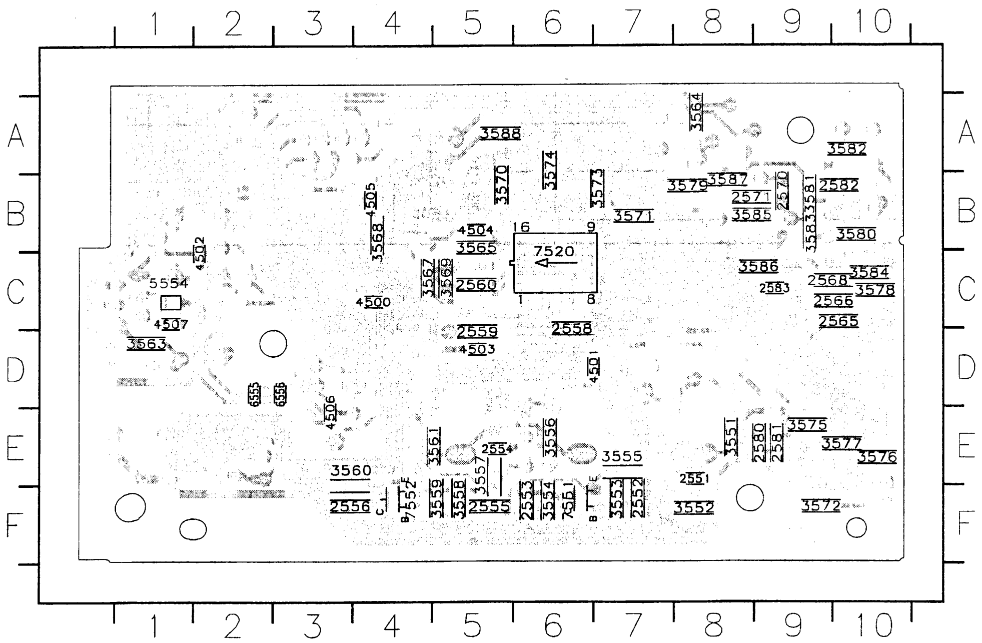

F303
3286
3280
F311
F312
3272
F314
F313
F301
3273
F302
F310
3274

## Connector PCB ACP3

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2551 | E3 | 2559 | D6 | 2580 | E2 | 3554 | F5 | 3561 | E6 | 3570 | B6 | 3577 | E1 | 3584 | C1 | 4502 | C9 | 6555 | D9 |
| 2552 | F4 | 2560 | C6 | 2581 | E2 | 3555 | E4 | 3563 | D10 | 3571 | B4 | 3578 | C1 | 3585 | B2 | 4503 | D6 | 6556 | D8 |
| 2553 | F5 | 2565 | C1 | 2582 | B1 | 3556 | E5 | 3564 | A3 | 3572 | F2 | 3579 | B3 | 3586 | C2 | 4504 | B6 | 7520 | C5 |
| 2554 | E6 | 2566 | C1 | 2583 | C2 | 3557 | E6 | 3565 | B6 | 3573 | B4 | 3580 | B1 | 3587 | B3 | 4505 | B7 | 7551 | F5 |
| 2555 | F6 | 2568 | C1 | 3551 | E3 | 3558 | F6 | 3567 | C6 | 3574 | A5 | 3581 | B2 | 3588 | A6 | 4506 | E8 | 7552 | F7 |
| 2556 | F7 | 2570 | B2 | 3552 | F3 | 3559 | F6 | 3568 | B7 | 3575 | E2 | 3582 | A1 | 4500 | C7 | 4507 | C10 | | |
| 2558 | D5 | 2571 | B2 | 3553 | F4 | 3560 | E7 | 3569 | C6 | 3576 | E1 | 3583 | B2 | 4501 | D4 | 5554 | C10 | | |

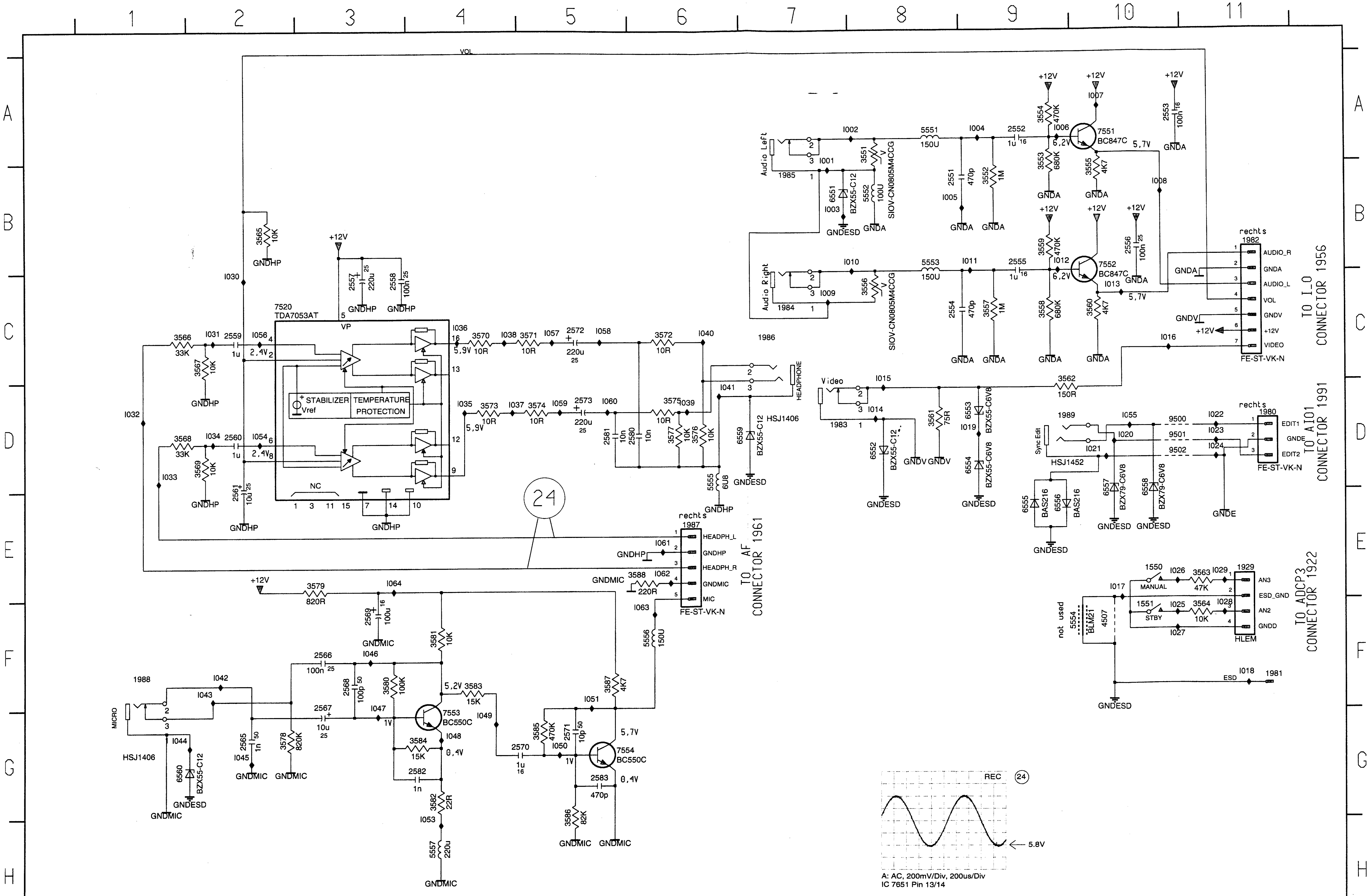

1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
1981
1987
1982
1980
5557
1551
5556
2573
7553
2569
2572
2561
2557
9503
6557
2567
7554
5555
3566
9501
9502
6558
9500
1929
9507
9505
6560
5552
6551
3562
9506
1550
1988
1989
6559
5551
5553
1983
6553
6552
1986
1985
1984
6554

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2551 | E8 | 2559 | D5 | 2580 | E9 | 3554 | F6 | 3561 | E5 | 3570 | B5 | 3577 | E10 | 3584 | C10 | 4502 | C2 | 6555 | D2 |
| 2552 | F7 | 2560 | C5 | 2581 | E9 | 3555 | E7 | 3563 | D1 | 3571 | B7 | 3578 | C10 | 3585 | B8 | 4503 | D5 | 6556 | D3 |
| 2553 | F6 | 2565 | C10 | 2582 | B10 | 3556 | E6 | 3564 | A8 | 3572 | F9 | 3579 | B8 | 3586 | C9 | 4504 | B5 | 7520 | C6 |
| 2554 | E5 | 2566 | C10 | 2583 | C9 | 3557 | E5 | 3565 | B5 | 3573 | B7 | 3580 | B10 | 3587 | B8 | 4505 | B4 | 7551 | F6 |
| 2555 | F5 | 2568 | C9 | 3551 | E8 | 3558 | F5 | 3567 | C4 | 3574 | A6 | 3581 | B9 | 3588 | A5 | 4506 | E3 | 7552 | F4 |
| 2556 | F3 | 2570 | B9 | 3552 | F8 | 3559 | F5 | 3568 | B4 | 3575 | E9 | 3582 | A10 | 4500 | C4 | 4507 | C1 | | |
| 2558 | D6 | 2571 | B8 | 3553 | F7 | 3560 | E3 | 3569 | C5 | 3576 | E10 | 3583 | B9 | 4501 | D7 | 5554 | C1 | | |


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
3564
3588
3570
3574
3573
3582
3579
3587
2571
2570
3581
2582
3571
3585
3583
4505
3568
4504
3565
7520
3580
4502
16
9
1
8
3567
3569
2560
3586
2583
2568
3584
3578
2566
2565
5554
4507
4500
2559
4503
2558
3563
4501
4506
3561
2554
3556
3555
3551
2580
2581
3575
3577
3576
3560
3557
2551
2556
7552
3559
3558
2555
2553
3554
7551
2552
3552
3572

# Connector PCB ACP3

| | |
|---|---|
| 1550 | E10 |
| 1551 | F10 |
| 1929 | E11 |
| 1980 | D11 |
| 1981 | F11 |
| 1982 | B11 |
| 1983 | D7 |
| 1984 | C7 |
| 1985 | B7 |
| 1986 | C7 |
| 1987 | E6 |
| 1988 | F1 |
| 1989 | D9 |
| 2551 | B8 |
| 2552 | A9 |
| 2553 | A10 |
| 2554 | C8 |
| 2555 | B9 |
| 2556 | B10 |
| 2557 | C3 |
| 2558 | C3 |
| 2559 | C2 |
| 2560 | D2 |
| 2561 | D2 |
| 2565 | G2 |
| 2566 | F3 |
| 2567 | F3 |
| 2568 | F3 |
| 2569 | F3 |
| 2570 | G5 |
| 2571 | G5 |
| 2572 | C5 |
| 2573 | D5 |
| 2580 | D6 |
| 2581 | D5 |
| 2582 | G4 |
| 2583 | G5 |
| 3551 | A8 |
| 3552 | B9 |
| 3553 | B9 |
| 3554 | A9 |
| 3555 | B10 |
| 3556 | C8 |
| 3557 | C9 |
| 3558 | C9 |
| 3559 | B9 |
| 3560 | C10 |
| 3561 | D8 |
| 3562 | D9 |
| 3563 | E11 |
| 3564 | F11 |
| 3565 | B2 |
| 3566 | C1 |
| 3567 | C2 |
| 3568 | D1 |
| 3569 | D2 |
| 3570 | C4 |
| 3571 | C5 |
| 3572 | C6 |
| 3573 | D4 |
| 3574 | D5 |
| 3575 | D6 |
| 3576 | D6 |
| 3577 | D6 |
| 3578 | G2 |
| 3579 | E3 |
| 3580 | F3 |
| 3581 | F4 |
| 3582 | G4 |
| 3583 | F4 |
| 3584 | G4 |
| 3585 | G5 |
| 3586 | H5 |
| 3587 | F5 |
| 3588 | E6 |
| 4507 | F10 |
| 5551 | A8 |
| 5552 | B8 |
| 5553 | B8 |
| 5554 | F10 |
| 5555 | D6 |
| 5556 | F6 |
| 5557 | H4 |
| 6551 | B7 |
| 6552 | D8 |
| 6553 | D9 |
| 6554 | D9 |
| 6555 | E9 |
| 6556 | E9 |
| 6557 | D10 |
| 6558 | D10 |
| 6559 | D7 |
| 6560 | G1 |
| 7520 | C2 |
| 7551 | A10 |
| 7552 | B10 |
| 7553 | G4 |
| 7554 | G5 |
| 9500 | D10 |
| 9501 | D10 |
| 9502 | D10 |
| I001 | A7 |
| I002 | A8 |
| I003 | B7 |
| I004 | A9 |
| I005 | B8 |
| I006 | A9 |
| I007 | A10 |
| I008 | B10 |
| I009 | C7 |
| I010 | B8 |
| I011 | B9 |
| I012 | B9 |
| I013 | C10 |
| I014 | D8 |
| I015 | C8 |
| I016 | C10 |
| I017 | E10 |
| I018 | F11 |
| I019 | D9 |
| I020 | D10 |
| I021 | D10 |
| I022 | D11 |
| I023 | D11 |
| I024 | D11 |
| I025 | F10 |
| I026 | E10 |
| I027 | F10 |
| I028 | F11 |
| I029 | E11 |
| I030 | C2 |
| I031 | C2 |
| I032 | D1 |
| I033 | D1 |
| I034 | D2 |
| I035 | D4 |
| I036 | C4 |
| I037 | D4 |
| I038 | C4 |
| I039 | D6 |
| I040 | C6 |
| I041 | D6 |
| I042 | F2 |
| I043 | F2 |
| I044 | G1 |
| I045 | G2 |
| I046 | F3 |
| I047 | F3 |
| I048 | G4 |
| I049 | G4 |
| I050 | G5 |
| I051 | F5 |
| I053 | H4 |
| I054 | D2 |
| I055 | D10 |
| I056 | C2 |
| I057 | C5 |
| I058 | C5 |
| I059 | D5 |
| I060 | D5 |
| I061 | E6 |
| I062 | E6 |
| I063 | F6 |
| I064 | E3 |


1
2
3
4
5
6
7
8
9
10
11
A
B
C
D
E
F
G
H
VOL
Audio Left
Audio Right
1985
1984
I001
I002
I003
I009
I010
5551 150U
5553 150U
3551
3556
SIOV-CN0805M4CCG
6551 BZX55-C12
5552 100U
2551 470p
3552 1M
2554 470p
3557 1M
2552 1u 16
2555 1u 16
+12V
I007
3554 470K
3553 680K
3555 4K7
3559 470K
3558 680K
3560 4K7
2553 100n 16
2556 100n 25
7551 BC847C
7552 BC847C
6,2V
5,7V
GNDA
GNDESD
I008
I013
rechts
1982
AUDIO_R
GNDA
AUDIO_L
VOL
GNDV
+12V
VIDEO
FE-ST-VK-N
TO I_O CONNECTOR 1956
I016
3565 10K
GNDHP
7520 TDA7053AT
VP
STABILIZER
TEMPERATURE PROTECTION
Vref
NC
2557 220u 25
2558 100n 25
3566 33K
3567 10K
3568 33K
3569 10K
2559 1u
2560 1u
2561 10u 25
2,4V
5,9V
3570 10R
3571 10R
3573 10R
3574 10R
2572 220u 25
2573 220u 25
3572 10R
3575 10R
2581 10n
2580 10n
3577 10K
3576 10K
5555 6U8
6559 BZX55-C12
HSJ1406
HEADPHONE
1986
24
rechts
1987
HEADPH_L
GNDHP
HEADPH_R
GNDMIC
MIC
TO AF CONNECTOR 1961
3588 220R
5556 150U
Video
1983
I014
I015
3561 75R
6552 BZX55-C12
6553 BZX55-C6V8
6554 BZX55-C6V8
3562 150R
GNDV
1989
Sync Edit
HSJ1452
9500
9501
9502
I020
I021
I022
I023
I024
I055
rechts
1980
EDIT1
GNDE
EDIT2
TO AIO1 CONNECTOR 1991
6555 BAS216
6556 BAS216
6557 BZX79-C6V8
6558 BZX79-C6V8
GNDE
1550 MANUAL
1551 STBY
3563 47K
3564 10K
1929
AN3
ESD_GND
AN2
GNDD
HLEM
TO ADCP3 CONNECTOR 1922
not used
5554 BLM21
4507
1981
ESD
3579 820R
2569 100u 16
3581 10K
2566 100n 25
2568 100p 50
3580 100K
7553 BC550C
5,2V
3583 15K
3584 15K
0,4V
1V
2582 1n
3582 22R
5557 220u
GNDMIC
1988
MICRO
HSJ1406
2565 1n 50
3578 820K
6560 BZX55-C12
2567 10u 25
3587 4K7
3585 470K
2571 10p 50
2570 1u 16
7554 BC550C
5,7V
2583 470p
3586 82K
REC
5.8V
A: AC, 200mV/Div, 200us/Div
IC 7651 Pin 13/14

**Interconnections Manual Page**

| | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF | 3-26 | AIO2 | 3-41 | CNR | 3-36 | DE | 3-42 | FF | 3-43 | FOME | 3-44 | HA | 3-32 | PE | 3-40 | QNIC | 3-46 | VS | 3-31 |
| AIO1 | 3-38 | AL | 3-28 | DC | 3-48 | ER | 3-27 | FM_STEREO | 3-25 | FV | 3-24 | I_O | 3-37 | PS | 3-22 | VPO | 3-45 | VS_SEC | 3-35 |

PCS 93957

# 4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

To obtain a high repair standard we have developped a range of service kit's. These kit's covers the spare parts which are engaged together.
The tape deck's sensors are located on the motherboard underneath the tape deck, and included in its circuitry, lay out and parts list.

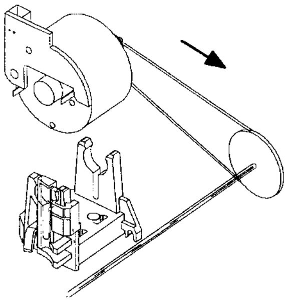
## 4.1 Deck parts replacement

The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.
All the other deck assembly parts are held only by snap hooks.

For the replacement of parts on the underside of the tape deck, remove the tape deck from the motherboard.

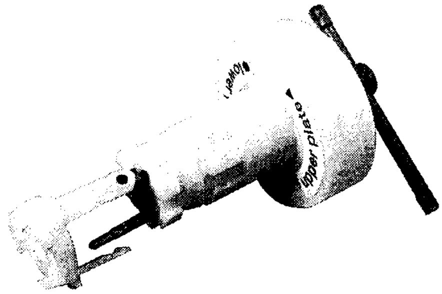
Manual extraction of cassette:
If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

fig. 1

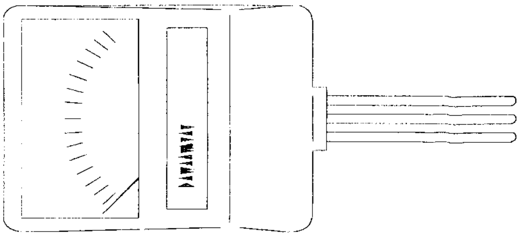


**IMPORTANT:**
After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into „eject" position by hand.

## Auxiliary tools for deck adjustment:

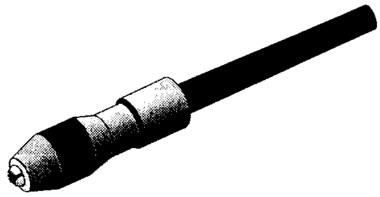


Tool for removing the head disc 4822 395 90977

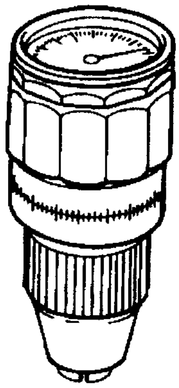


Tentelometer 4822 395 90584

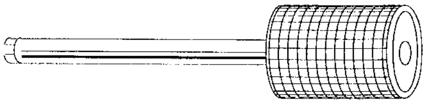
Tool for tapetension adjustment 4822 395 50188



Handle 4822 256 90493



Torquemeter:
600 gf-cm 4822 395 90232
90 gf-cm 4822395 80196



Post adjustment screwdriver 4822 395 50275

Testcassette 4822 397 30103

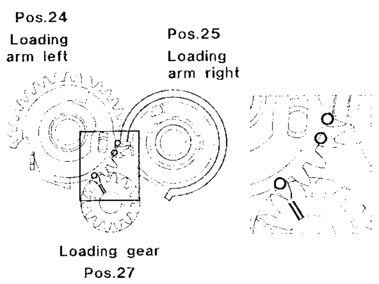
Nylon gloves 5322 395 94022

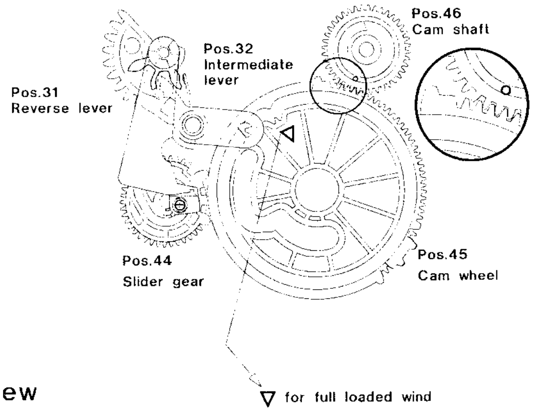
### 4.1.1 Deck lay out diagram

Deck in position „threaded out".

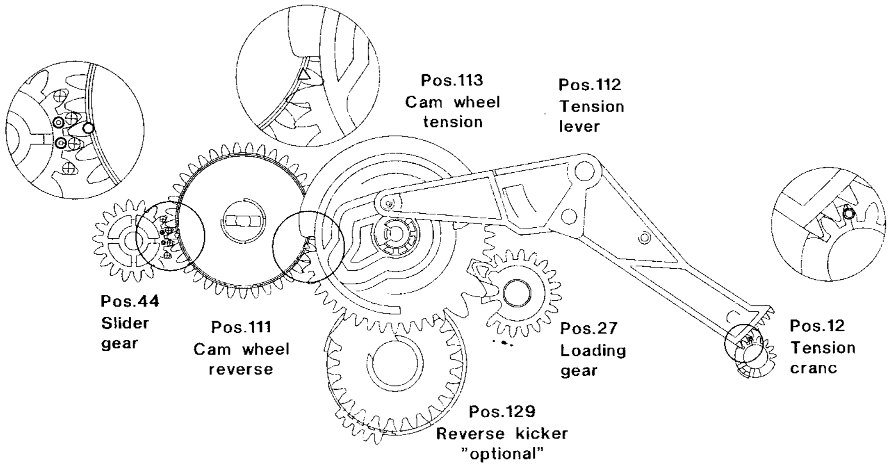
The following diagrams indicate the relative position of the gearwheels and levers when the deck is in the threaded out (cassette-compartment down) position.

Top view


Pos.24
Loading arm left
Pos.25
Loading arm right
Loading gear
Pos.27


Pos.46
Cam shaft
Pos.32
Intermediate lever
Pos.31
Reverse lever
Pos.44
Slider gear
Pos.45
Cam wheel
∇ for full loaded wind

Underside view


Pos.113
Cam wheel tension
Pos.112
Tension lever
Pos.44
Slider gear
Pos.111
Cam wheel reverse
Pos.27
Loading gear
Pos.12
Tension cranc
Pos.129
Reverse kicker
"optional"

### 4.1.2 The Lift

Refitting the lift compartment:
Ensure the lift compartment is down and gear A is rotated one click stop anticlockwise from the down position.
The removal and refitting of the lift can be carried out in all deck positions with the exception of „eject" (ensure that gears 103/105 are free).

To remove the lift:
Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
Unscrew the 4 screws on the underside of the deck.
Carefully remove the lift vertically, noting the position of the record protect operating lever.

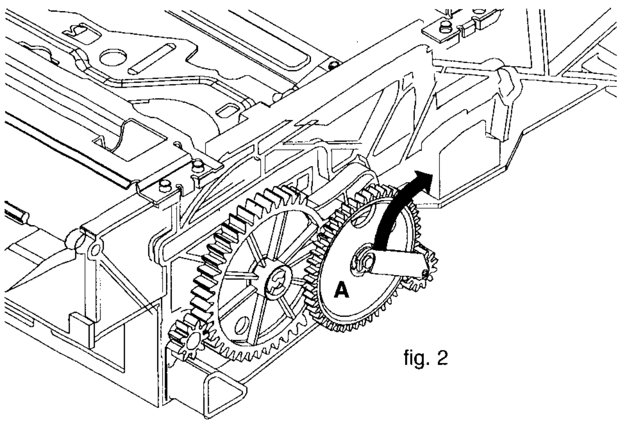


fig. 2

### 4.1.3 Head disc replacement

**Removal :**
Nylon gloves should be worn when handling the head disc.
Turn the headdisc until the long hole of the rotor appears in the bigger hole of the scannermotor
Insert the reference pin C (included with each service head disc) through the bigger hole of the lid of the scanner motor until the pin snaps in the long hole of the rotor. (Fig. 3)

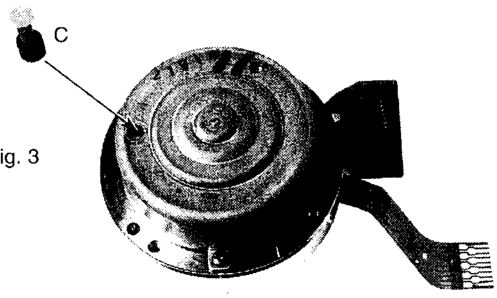


fig. 3

**Important:**
Choose Installation/Removal of the upper/lower clamping element by turning and attaching the reference element to the tool. (Fig. 4)

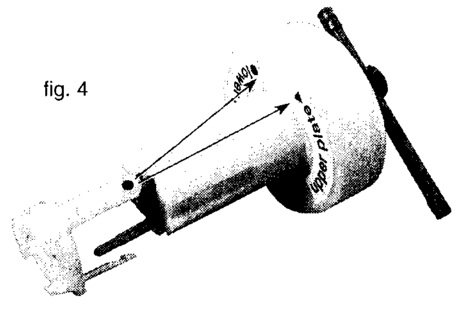

upper plate

fig. 4

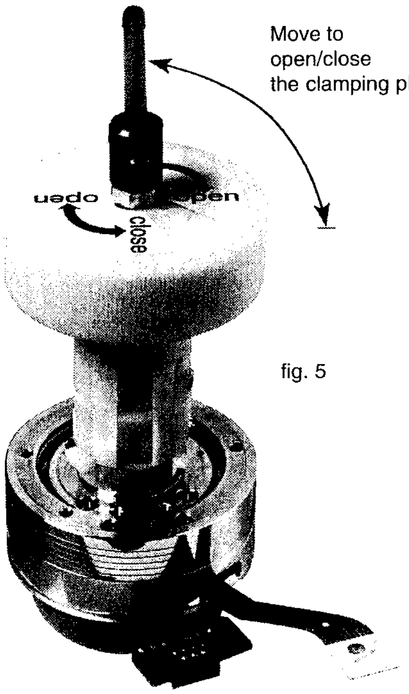


fig. 5

Position the tool on the upper clamping element, loosen the clamping element by turning the lever 90 degrees and remove it from the head disc. (Fig. 5)

Prepare the tool for the lower clamping element.Position the tool on the head disc and make sure that all 3 pins are snapped in the the lower clamping element. Loosen the clamping element by turning the lever 90 degrees and remove the head disc plus the tool from the scanner spindle. (Fig.6)

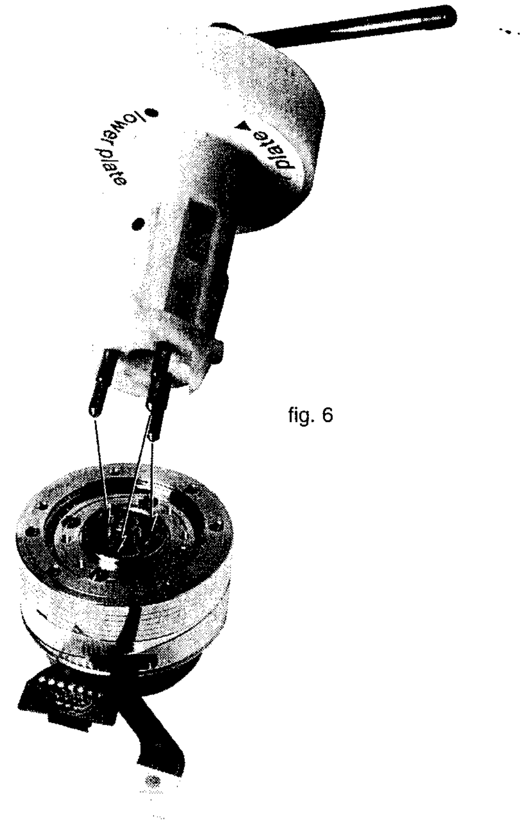


fig. 6

**Installation:**
Before carrying out the installation of the new head disc make sure that the scanner motor spindle is clean and undamaged. (The spindle has to be free of grease and must not be touched with bare hands)
Insert the 2 Mylar foils (included with each head disc) in the head disc. (Fig.7)

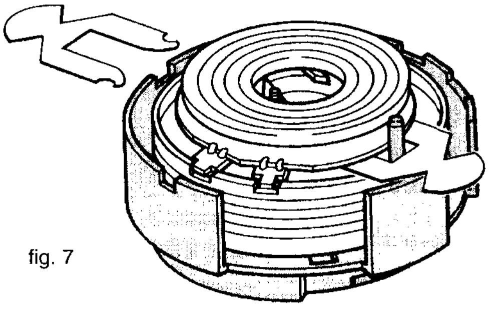


fig. 7

Position the tool (reference: lower clamping element) on the new headdisc (with protective cover) and loosen the lower clamping element.
Position the head disc so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the scanner print). (Fig. 8)

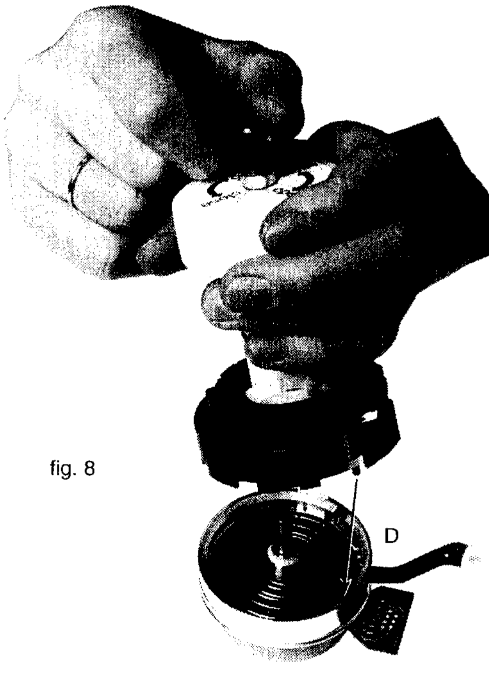


fig. 8

Reach the exact position through pressing the tool down with a force of 1 N. and fix the lower clamping element by turning the lever towards „close".
Remove the tool.
Change the tool to „upper clamping element" and position the clamping element exactly. (Fig. 9)

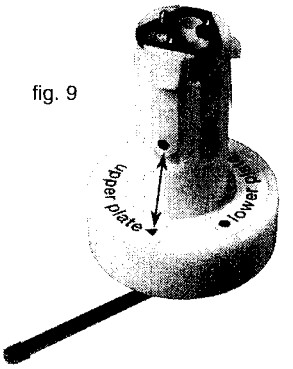


fig. 9

Tighten the clamping element through turning the lever towards „open". Position the tool planely on the head disc and fix the clamping element. (Fig.5 „close")
Remove the protecting cap from the head disc, withdraw the two Mylar foils and remove the reference pin C.

**After replacing the head disc, carry out the following adjustments and checks :**
Head switching pulse (gap position, chapter 3)
Write current adjustments (chapter 3)
Check tape path alignment (see paragraph 4.2.1.)

### 4.1.4 A/C Head (Combi head) (Pos. 36)

Remove the fixing spring (A) (fig. 10)
Remove the fixing screw and replace the A/C head.
Use a new fixing spring (included with new A/Chead) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.2 have to be carried out.

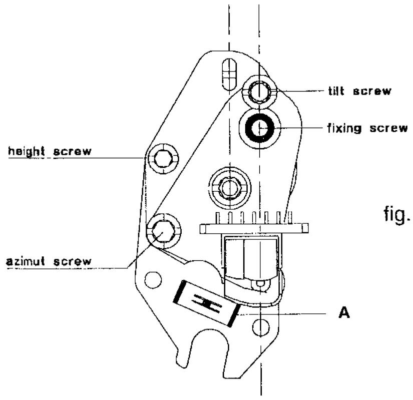


fig. 10

### 4.1.5 Threading motor (Pos. 38)

Remove the belt and disconnect the connector plug.
Remove the threading motor from the motor supports (Fig. 11).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

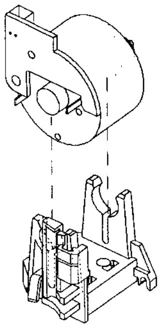


fig. 11

### 4.1.6 Capstan motor (Pos. 127)

Remove the tape deck.
Remove the belt (pos.126) on the underside;
Remove the three capstan motor fixing screws (Fig. 12) and withdraw the capstan motor downward from the drive assy.
The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

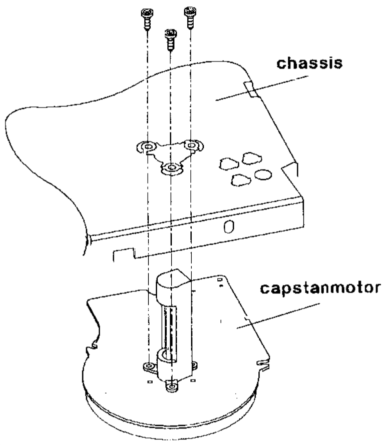


fig. 12

### 4.1.7 Pressure roller (Pos. 37)

Remove the tape deck
Unhook and remove the pressure roller tension spring.
Release the pressure roller guide (pos. 41) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn (Fig. 13) The pressure roller and guide can now be lifted clear.

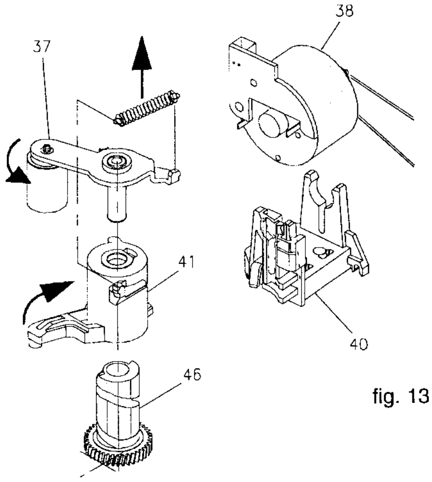
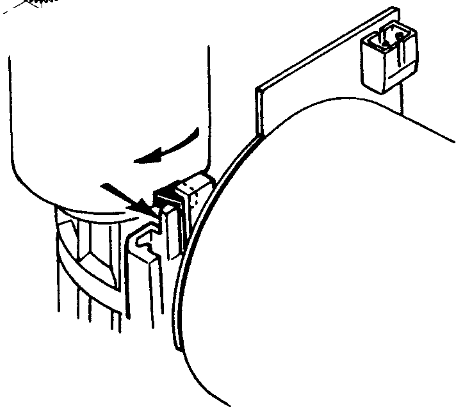


fig. 13



Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

### 4.1.8 Roller unit right (Pos. 26)

Remove the tape deck.
Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 14).
Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE: During reassembly ensure the link from 25 is engaged in the hole of the holder plate 26.
After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

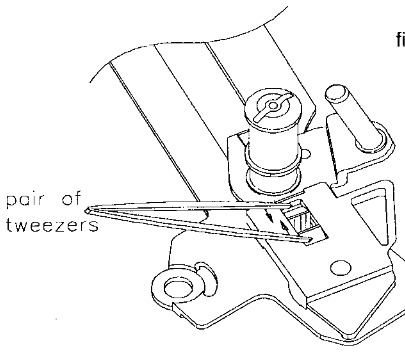


fig. 10

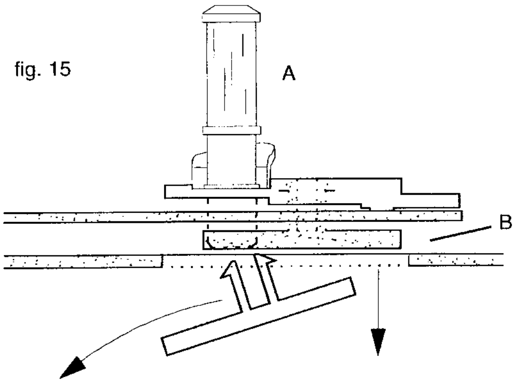
### 4.1.9 Roller unit left (Pos.23)

Set the drive assy to „Eject“ position.
Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
At the bottom side of the drive assy remove the tension lever (pos.112).
Compress the two snap hooks by means of a pair of tweezers (Fig. 9)and remove the roller assy (A) from the plate (B).
Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 15).
The reassembly is carried out in reverse order.

NOTE : During reassembly
1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

fig. 15

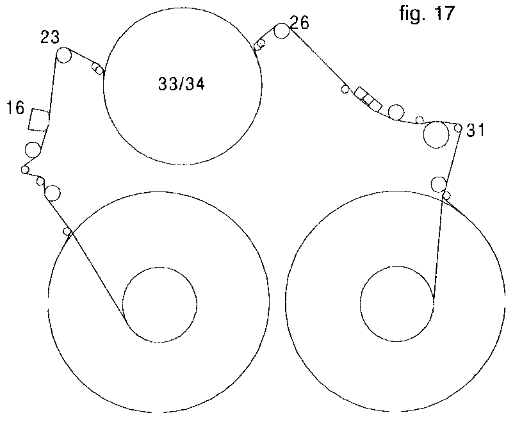


## 4.2 Adjustments

Adjustments must not be made in the service position.

### 4.2.1 Tape path

fig. 17


23
26
33/34
16
31

#### 4.2.1.1 Roller left unit/roller unit right

**Preparation:**
Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL (pos.7460 IC SAA1310 pin16). The other input (DC coupled) to observe the tracking information TRIV.
Trigger the oscilloscope externally on the head pulse HP1 ("SWIN").
Playback the black and white section of the alignment test tape.
Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:

1. Call the service test program (chapter 2.1)
2. Activate manual tracking (service test program step 03) and watch the tape sync pulse move to the left in relation to the TRIV signal.
3. Note the extreme left hand position reached by the sync pulse, repeat as necessary.
4. Stop the movement of the pulse when the TRIV signal reduces to 1/2 to 2/3 maximum amplitude by pressing the normal play button. A noisy picture (disturbances) is visible on the TV set and the CTL pulse should be to the left of the display.

The recorder will hold this position until the service test progam step 03 is left.
This condition works only if X-distance is adjusted.

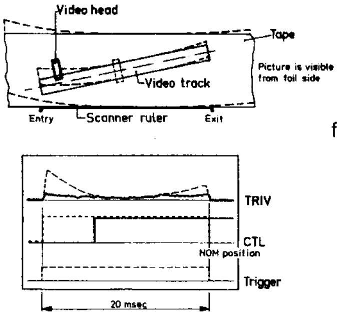

Video head
Tape
Picture is visible from foil side
Video track
Entry
Scanner ruler
Exit
TRIV
CTL
NOM position
Trigger
20 msec

fig. 18

**Adjustment:**
Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 18).

#### 4.2.1.2 A/C Combi head

**Tilt angle adjustment**

Set the drive to feature mode (e.g. +7)
Adjustment :
By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 19) the tape must not be distorted at the lower edge (by pressing onto guide).

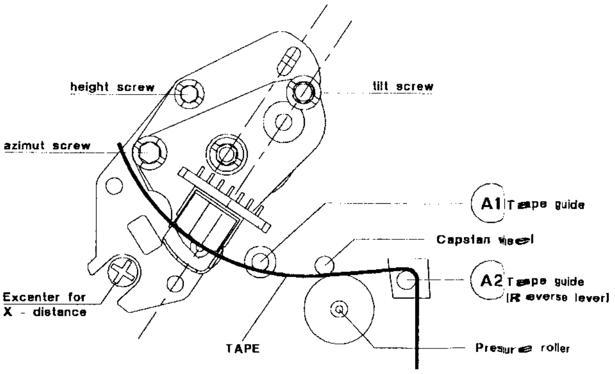

height screw
tilt screw
azimut screw
A1 Tape guide
Capstan wheel
A2 Tape guide
(Reverse lever)
Excenter for
X - distance
TAPE
Pressure roller

fig.19

**Adjustment of the azimuth angle and the head height**

Connect an oscilloscope to the linear Audio output.
Play the section of the test cassette with the audio signal 400 Hz.
Adjust for maximum output voltage by means of the height adjustment screw
Play the section of the test cassette with the audio signal 8 kHz.
Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 19).
If necessary, repeat this procedure
Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

## 4.2.2 Adjustment of the horizontal distance (x-distance)

Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the „play" button. Playback the black/white part of the test cassette.)
Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the excentric screw (Fig.19).

## 4.2.3 Brake band and tape tension

Due to further development it is no longer necessary to make theseadjustments after replacement of the brake band.
If the brake band or tape tension are completely misadjusted, set them to a center position; set the drive to „play" and adjust the brake band until the edge of the elbow of the tape tension arm is aligned with the left inner edge of the left guide (fig. 20).

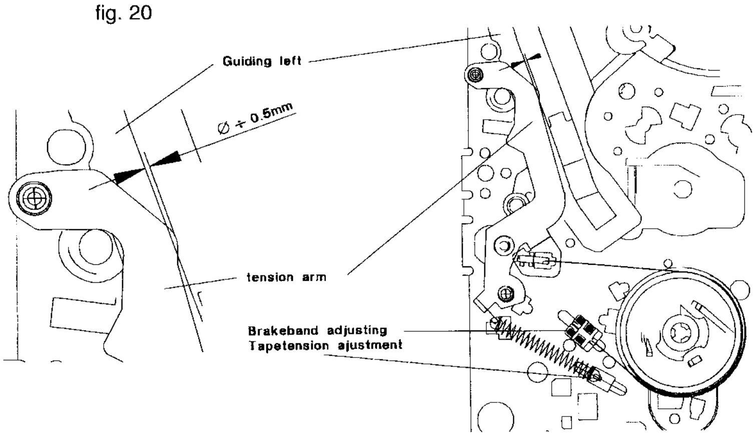
## 4.2.4 Friction clutch control check

Set the drive to „Play" position.
Place the torquemeter on the right reel.
Turn the capstan motor to move the right reel clockwise.
Keep turning, until the indication at the torquemeter no longer changes (Fig. 21)
The torque has to be 10,5 mNm +/-25% (105gFcm +/-25%)

## 4.2.5 Reverse brake control

Set the drive to „Reverse" position.
Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
The value indicated at the torquemeter has to be 7mNm +/-3mNm (70 gFcm +/-30gFcm) (Fig. 21).

fig. 20



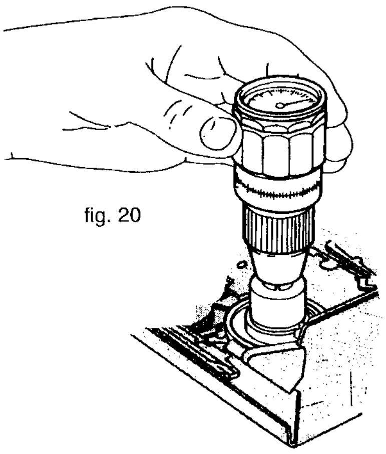
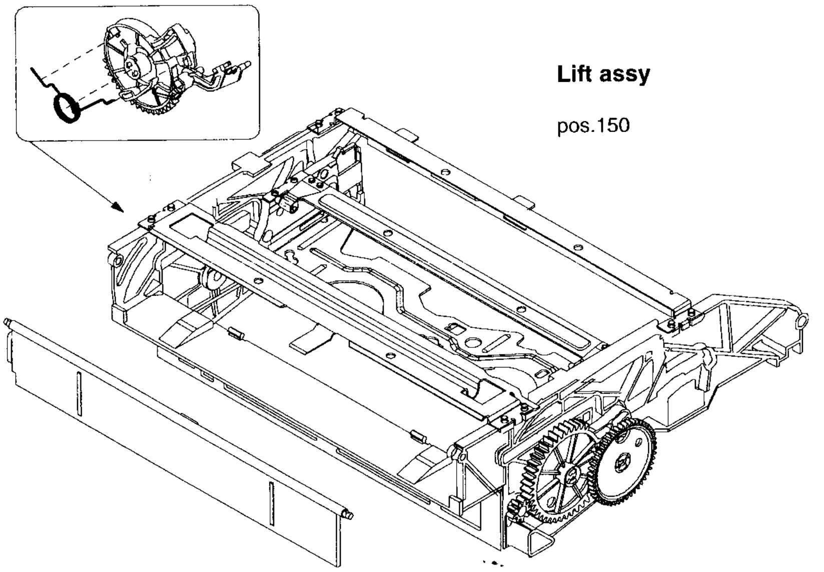


fig. 20

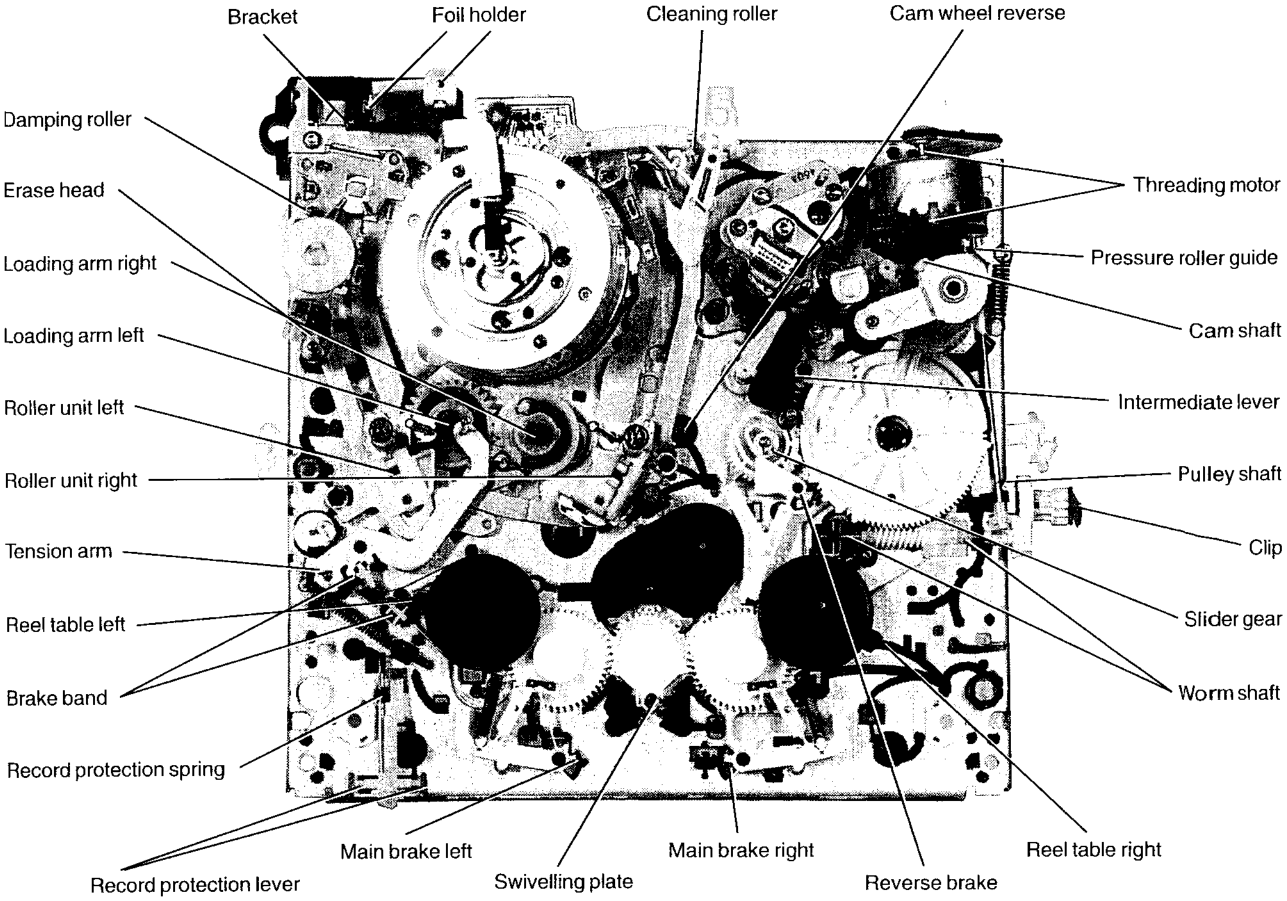


**Lift assy**

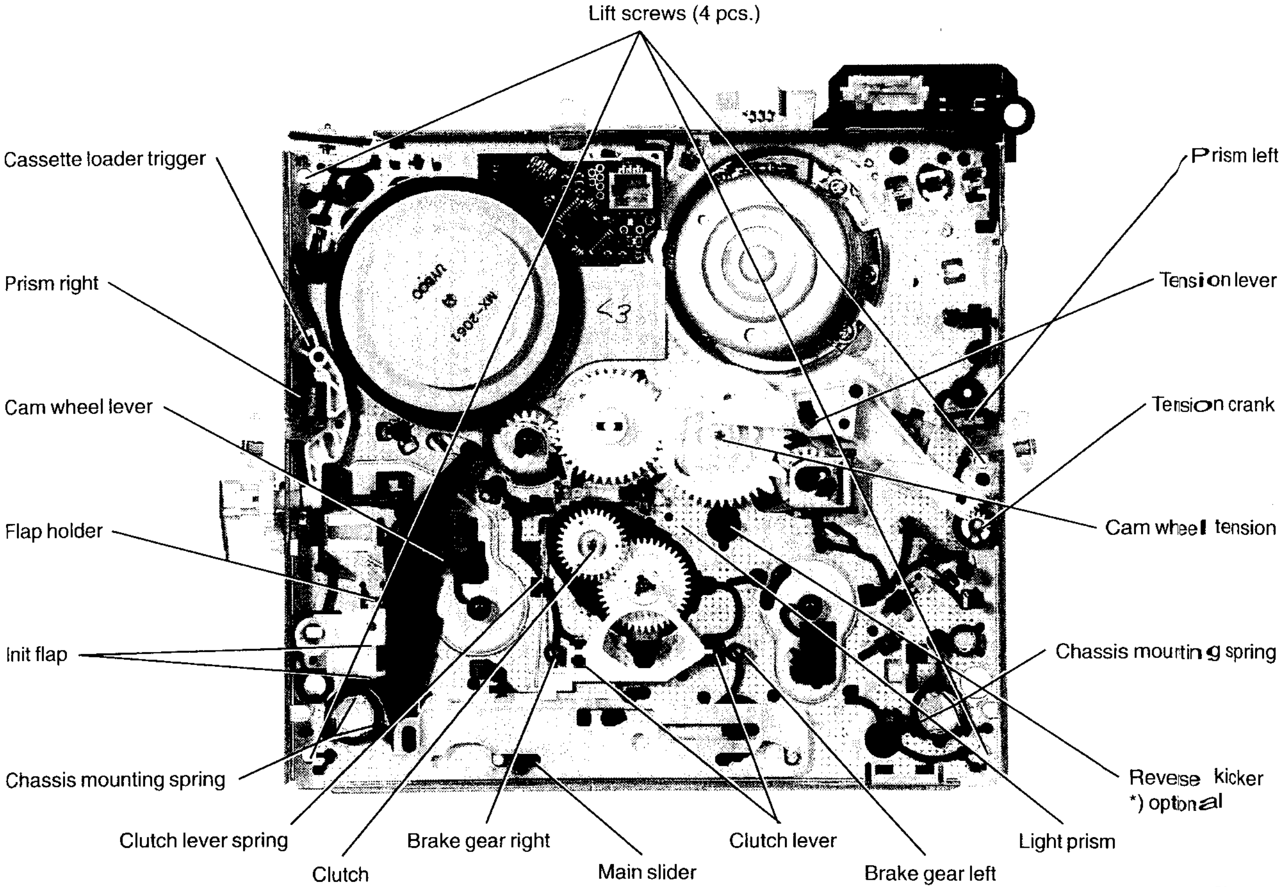
pos.150

**In order to make the replacement of the deck parts easier, the snap hooks are marked with an arrow.**

## TOP VIEW

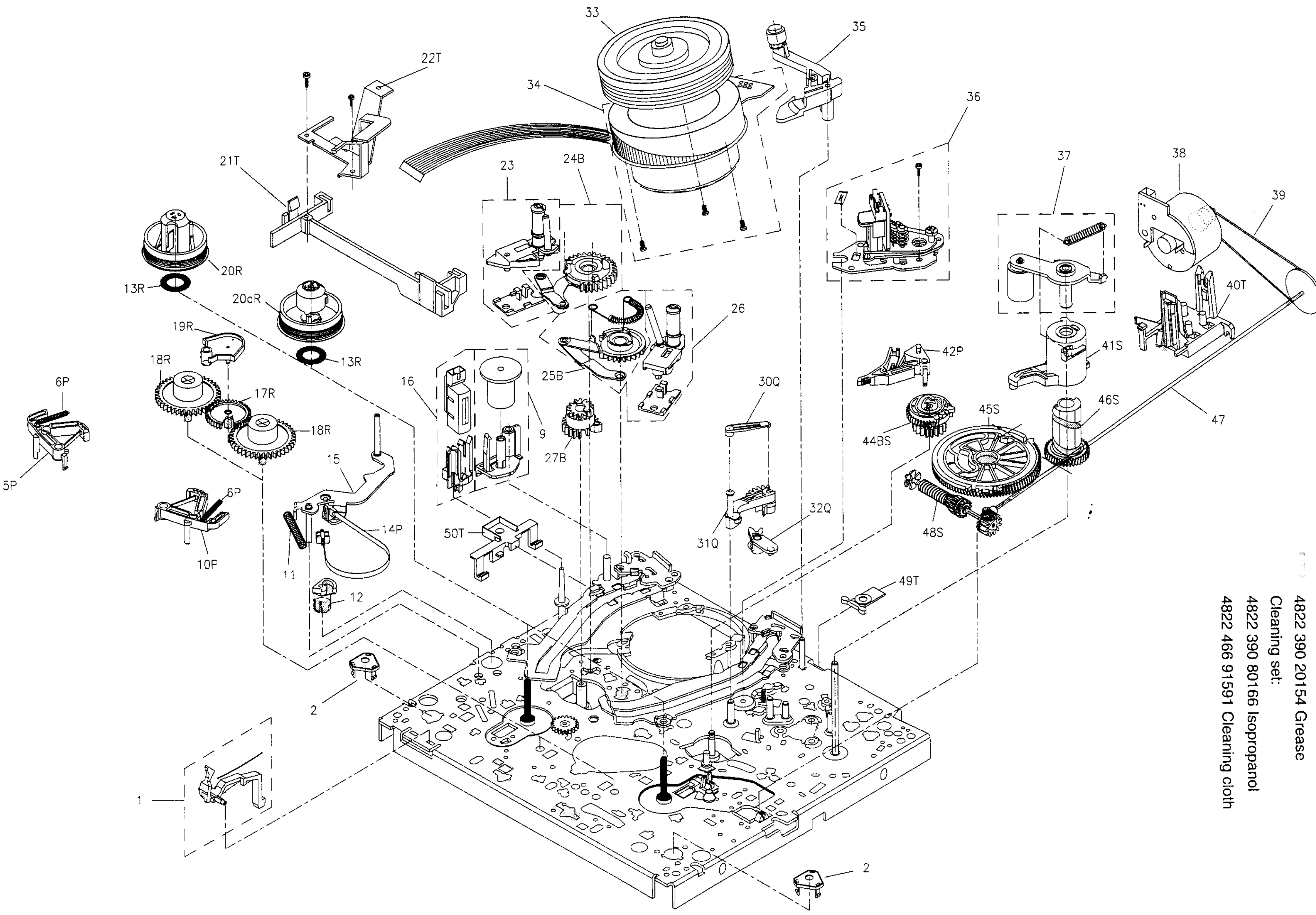

Bracket
Foil holder
Cleaning roller
Cam wheel reverse
Damping roller
Erase head
Loading arm right
Loading arm left
Roller unit left
Roller unit right
Tension arm
Reel table left
Brake band
Record protection spring
Record protection lever
Main brake left
Swivelling plate
Main brake right
Reverse brake
Reel table right
Threading motor
Pressure roller guide
Cam shaft
Intermediate lever
Pulley shaft
Clip
Slider gear
Worm shaft

## UNDERSIDE VIEW


Lift screws (4 pcs.)
Cassette loader trigger
Prism right
Cam wheel lever
Flap holder
Init flap
Chassis mounting spring
Clutch lever spring
Clutch
Brake gear right
Main slider
Clutch lever
Brake gear left
Light prism
Prism left
Tension lever
Tension crank
Cam wheel tension
Chassis mounting spring
Reverse kicker
*) optional

## 4.2 Exploded view

Top view


33
35
22T
34
36
21T
23
24B
37
38
39
20R
13R
20aR
26
40T
19R
13R
18R
17R
6P
16
9
25B
42P
41S
30Q
18R
27B
45S
46S
47
44BS
15
5P
6P
14P
50T
32Q
48S
31Q
10P
11
12
49T
2
1
2

■ 4822 390 10096 Oil

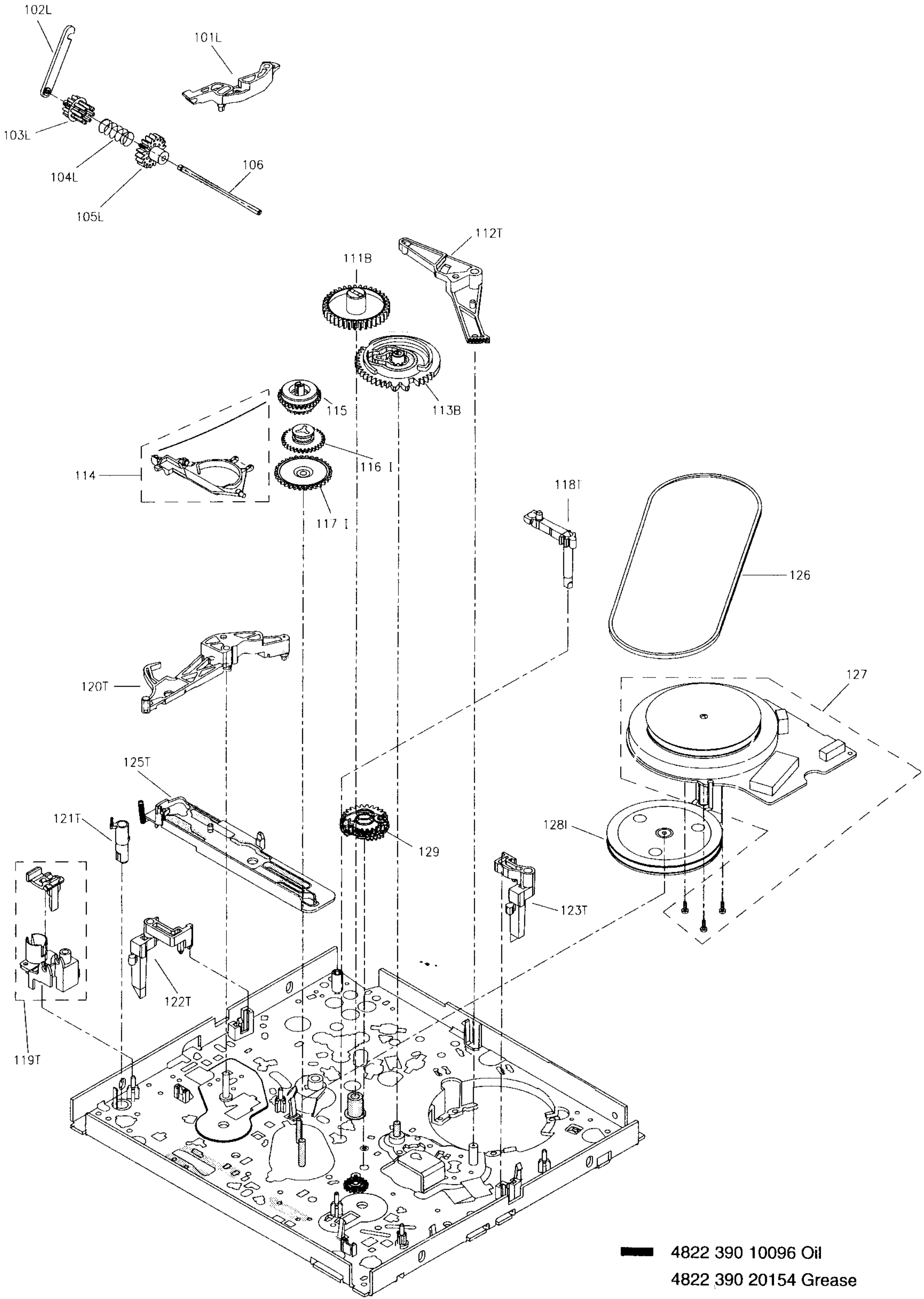
▨ 4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

Underside view


102L
101L
103L
104L
105L
106
112T
111B
115
113B
114
116 I
117 I
118T
126
127
120T
125T
121T
128I
129
123T
122T
119T

▬ 4822 390 10096 Oil

4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

# 4. DRIVE ASSEMBLY

## 4.1 MECHANICAL PARTS LIST

| Pos. | Description | KITS | | | | | | | | Code number 4822 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | B | I | L | P | Q | R | S | T | |
| 1 | Rec. protection lever (with spring) | | | | | | | | | 402 10202 |
| 2 | Chassis mounting spring (2x) | | | | | | | | | 492 71022 |
| 5 | Main brake left | | | | P | | | | | |
| 6 | Main brake spring (2x) | | | | P | | | | | |
| 9 | Damping roller *) | | | | | | | | | 528 70782 |
| 10 | Main brake right | | | | P | | | | | |
| 11 | Tension arm spring | | | | | | | | | 492 33317 |
| 12 | Tension crank | | | | | | | | | 403 70551 |
| 13 | Slip ring | | | | | | R | | | |
| 14 | Tension band | | | | P | | | | | |
| 15 | Tension arm | | | | | | | | | 403 70547 |
| 16 | Erase head | | | | | | | | | 249 10522 |
| 17 | Swivelling gear | | | | | | R | | | |
| 18 | Brake gear (2x) | | | | | | R | | | |
| 19 | Swivelling plate | | | | | | R | | | |
| 20 | Reel table (S) | | | | | | R | | | |
| 20a | Reel table (T) | | | | | | R | | | |
| 21 | Headamplifier holder | | | | | | | | T | |
| 22 | Bracket | | | | | | | | T | |
| 23 | Roller unit left | | | | | | | | | 528 70771 |
| 24 | Loading arm left | B | | | | | | | | |
| 25 | Loading arm right | B | | | | | | | | |
| 26 | Roller unit right | | | | | | | | | 528 70772 |
| 27 | Loading gear | B | | | | | | | | |
| 30 | Reverse clip | | | | | Q | | | | |
| 31 | Reverse lever | | | | | Q | | | | |
| 32 | Intermediate lever | | | | | Q | | | | |
| 33 | Head disc 4/2 ( /1) | | | | | | | | | 691 10548 |
| 33 | Head disc 4/2 (/1)Secam | | | | | | | | | 691 10551 |
| 34 | Scanner motor 4/2 (with screws) | | | | | | | | | 361 10901 |
| 35 | Cleaning roller | | | | | | | | | 528 70773 |
| 36 | A/C Head (with clip and screws) | | | | | | | | | 249 10468 |
| 37 | Pressure roller (with spring) | | | | | | | | | 528 70774 |
| 38 | Threading motor | | | | | | | | | 361 10809 |
| 39 | Threading belt | | | | | | | | | 358 20421 |
| 40 | Motor holder | | | | | | | | T | |
| 41 | Pressure roller guide | | | | | | | S | | |
| 42 | Reverse brake | | | | P | | | | | |
| 44 | Slider gear | B | | | | | | S | | |
| 45 | Cam wheel | | | | | | | S | | |
| 46 | Cam shaft | | | | | | | S | | |
| 47 | Pulley shaft | | | | | | | | | 528 81462 |
| 48 | Worm shaft | | | | | | | S | | |
| 49 | Chassis mounting clip | | | | | | | | T | |
| 50 | WD-holder | | | | | | | | T | |

| Pos. | Description | KITS | | | | | | | | Code number 4822 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | B | I | L | P | Q | R | S | T | |
| 101 | Cassette loader trigger | | | L | | | | | | |
| 102 | Clip | | | L | | | | | | |
| 103 | Cassette loader gear1 | | | L | | | | | | |
| 104 | Cassette loader spring | | | L | | | | | | |
| 105 | Cassette loader gear2 | | | L | | | | | | |
| 106 | Spindle | | | | | | | | | 535 93277 |
| 111 | Cam wheel reverse | B | | | | | | | | |
| 112 | Tension lever | | | | | | | | T | |
| 113 | Cam wheel tension | B | | | | | | | | |
| 114 | Clutch lever (with spring) | | | | | | | | | 403 70549 |
| 115 | Clutch | | | | | | | | | 528 20736 |
| 116 | Changing gear | | I | | | | | | | |
| 117 | Double gear | | I | | | | | | | |
| 118 | Light prism | | | | | | | | T | |
| 119 | Init flap and holder | | | | | | | | T | |
| 120 | Cam wheel lever | | | | | | | | T | |
| 121 | S-VHS lever | | | | | | | | T | |
| 122 | Prism rihgt | | | | | | | | T | |
| 123 | Prism left | | | | | | | | T | |
| 125 | Main slider | | | | | | | | T | |
| 126 | Driving belt | | | | | | | | | 358 31166 |
| 127 | Capstan motor (with screws) | | | | | | | | | 361 10805 |
| 129 | Reverse kicker with transmission gears *) | | | | | | | | | 522 20451 |
| 128 | Gear pulley | | I | | | | | | | |
| 150 | Lift | | | | | | | | | 443 64112 |
| | | | | | | | | | | |
| KIT | B | | | | | | | | | 310 31955 |
| KIT | I | | | | | | | | | 310 31963 |
| KIT | L | | | | | | | | | 310 32116 |
| KIT | P | | | | | | | | | 310 32191 |
| KIT | Q | | | | | | | | | 310 10658 |
| KIT | R | | | | | | | | | 310 10659 |
| KIT | S | | | | | | | | | 310 10661 |
| KIT | T | | | | | | | | | 310 10662 |

*) optional

Um eine hohen Reparaturstandard zu gewährleisten sind mit Ausnahme von Kit T immer alle im Kit enthaltenen Teile zu tauschen.

In order to guarantee a high repairstandard all spare parts included in a kit have to be replaced with the exception of kit T.

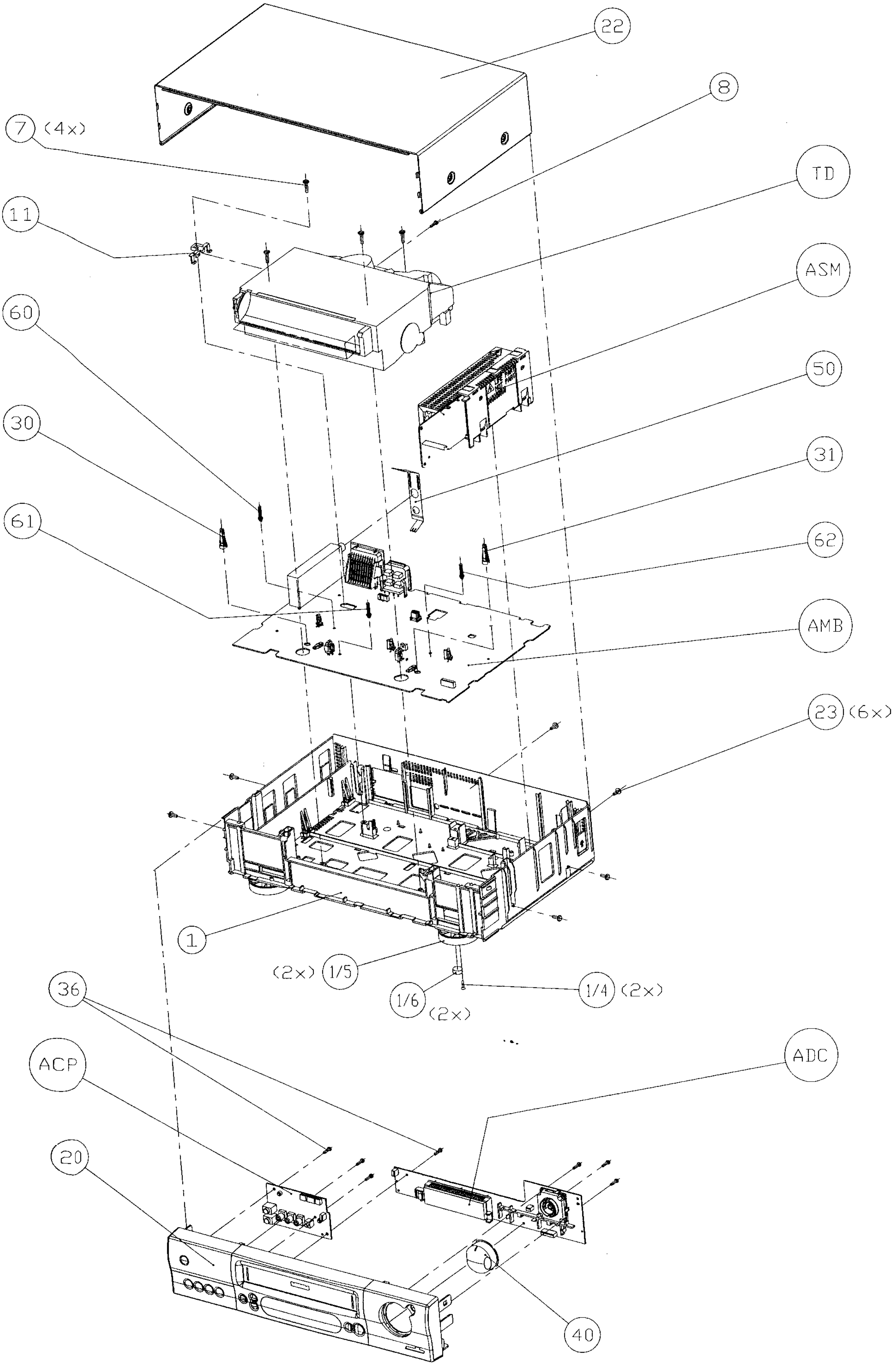
Per una riparazione garantita ocorre sostituire tutti i pezzi contenuti nei kit, fatta eccetione per il kit T.

Para obtener un estandár de reparaciones elevado,es necesario cambiar todas las partes contenidas en el kit, la única exceptión es para el kit T.

A fin d'obtenir un standard de réparations élevé, toutes les pièces de rechange incluses dans un kit sont à remplacer, exception faite du kit T.

Om een hoge reparatiekwaliteit te waarbogen moeten, met uitzondering van kit T, altijd alle zich in een kit bevindende onderdelen worden vervangen.

## Exploded View of the Set & Mechanical Parts


22
8
7 (4x)
TD
11
ASM
60
50
30
31
61
62
AMB
23 (6x)
1
(2x) 1/5
1/6 (2x)
1/4 (2x)
36
ACP
ADC
20
40

## Set Parts List

| Position | Code Number | Description |
|---|---|---|
| 1 | 4822 464 10465 | FRAME ASSY |
| 1/4 | 4822 502 11838 | SCREW P2,9X12 |
| 1/5 | 4822 462 11114 | FOOT ASSY |
| 1/6 | 4822 462 41806 | FOOT RUBBER INLAY |
| 7 | 4822 502 13884 | SCREW 3,5X16 |
| 8 | 4822 502 14431 | SCREENING SCREW |
| 11 | 4822 256 10504 | TD-HOLDER |
| 20 | 4822 426 10695 | CONTROL PANEL ASSY VR800/02/16/58 |
| 20 | 4822 426 10696 | CONTROL PANEL ASSY VR800/07 |
| 20 | 4822 426 10697 | CONTROL PANEL ASSY VR800/39 |
| 20 | 4822 426 10739 | CONTROL PANEL ASSY VR805/071 |
| 20 | 4822 426 10738 | CONTROL PANEL ASSY VR805/161 |
| 20 | 4822 426 10737 | CONTROL PANEL ASSY VR805/391 |
| 20 | 4822 426 10698 | CONTROL PANEL ASSY VR850/02/16/58 |
| 20 | 4822 426 10699 | CONTROL PANEL ASSY VR850/07 |
| 20 | 4822 426 10701 | CONTROL PANEL ASSY VR850/39 |
| 20/6 | 4822 443 11044 | LIFT FLAP ASSY VR800 |
| 20/6 | 4822 443 11085 | LIFT FLAP ASSY VR805 |
| 20/6 | 4822 443 11048 | LIFT FLAP ASSY VR850 |
| 20/7 | 4822 492 70896 | LEG SPRING LIFT FLAP |
| 20/11 | 4822 502 11839 | SCREW 2,9X8 |
| 20/13 | 4822 443 11045 | FLAP ASSY LEFT VR800/02 |
| 20/13 | 4822 443 11046 | FLAP ASSY LEFT VR800/07 |
| 20/13 | 4822 443 11047 | FLAP ASSY LEFT VR800/39 |
| 20/13 | 4822 443 11086 | FLAP ASSY LEFT VR805/071 |
| 20/13 | 4822 443 11084 | FLAP ASSY LEFT VR805/161 |
| 20/13 | 4822 443 11083 | FLAP ASSY LEFT VR805/391 |
| 20/13 | 4822 443 11049 | FLAP ASSY LEFT VR850/02 |
| 20/13 | 4822 443 11051 | FLAP ASSY LEFT VR850/07 |
| 20/13 | 4822 443 11052 | FLAP ASSY LEFT VR850/39 |
| 20/14 | 4822 417 11384 | HINGE LEFT |
| 20/15 | 4822 417 11385 | HINGE RIGHT |
| 22 | 4822 442 01513 | COVER LAQUERED VR850 |
| 22 | 4822 442 01567 | COVER LAQUERED VR805 |
| 22 | 4822 442 01511 | COVER LAQUERED VR800 |
| 23 | 4822 502 14109 | PLASTITE SCREW 3,5X1 |
| 30, 31 | 4822 256 10198 | DISTANCE HOLDER DECK |
| 36 | 4822 502 11838 | SCREW P2,9X12 |
| 40 | 4822 410 11973 | SHUTTLE KNOB ASSY |
| 50 | 4822 492 11687 | SPRING |
| 60, 61, 62 | 4822 256 10359 | DISTANCE HOLDER MOBO |

# Power Supply ASM

## MISCELLANEOUS

| | | | |
|---|---|---|---|
| 1115 | | 4822 267 51466 | 17P. Connector |
| 1150 | ⚠ | 4822 267 31064 | Mains Connector |
| 1151 | ⚠ | 4822 070 31252 | Fuse 1.25A |
| 1152 | | 4822 252 11215 | Surge Protector |
| 1153 | ⚠ | 4822 071 51001 | Fuse 100mA |

## CAPACITORS

| | | | | | |
|---|---|---|---|---|---|
| 2150 | ⚠ | 4822 121 10512 | 220 | nF | 275V |
| 2151 | | 4822 121 10789 | 100 | nF | 400V |
| 2152 | | 4822 124 11561 | 47 | µF | 400V |
| 2153 | ⚠ | 4822 126 14088 | 2,2 | nF | 250V |
| 2154 | | 4822 124 80604 | 47 | µF | 50V |
| 2155 | | 4822 121 43526 | 47 | nF | 250V |
| 2156 | | 4822 126 14126 | 47 | pF | 2KV |
| 2157 | | 4822 126 14126 | 47 | pF | 2KV |
| 2158 | | 4822 126 13614 | 4 | nF | 50V |
| 2159 | | 5322 122 32331 | 1 | nF | 100V |
| 2160 | | 5322 121 42386 | 100 | nF | 63V |
| 2161 | | 4822 121 70647 | 680 | pF | 100V |
| 2162 | | 5322 121 42386 | 100 | nF | 63V |
| 2163 | | 4822 124 40433 | 47 | µF | 25V |
| 2164 | | 4822 124 81029 | 100 | µF | 25V |
| 2165 | | 4822 124 12284 | 470 | µF | |
| 2166 | | 4822 124 12284 | 470 | µF | |
| 2167 | | 4822 124 12284 | 470 | µF | |
| 2168 | | 4822 121 70162 | 10 | nF | 400V |
| 2170 | | 4822 124 80604 | 47 | µF | 50V |
| 2172 | | 4822 126 13614 | 4 | nF | 50V |
| 2173 | | 4822 124 12285 | 2200 | µF | |
| 2174 | | 4822 124 12181 | 1000 | µF | 6,3V |
| 2175 | | 5322 121 42386 | 100 | nF | 63V |

## RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| 3150 | | 4822 116 21227 | VDR | | |
| 3151 | ⚠ | 4822 053 21335 | 3,3 | M | 0,5W |
| 3152 | | 4822 116 83872 | 220 | R | 0,5W |
| 3153 | ⚠ | 4822 053 21335 | 3,3 | M | 0,5W |
| 3154 | ⚠ | 4822 053 21335 | 3,3 | M | 0,5W |
| 3155 | ⚠ | 4822 052 10109 | 10 | R | 0,33W |
| 3156 | | 4822 053 11123 | 12 | k | 2W |
| 3157 | ⚠ | 4822 052 10102 | 1 | k | 0,33W |
| 3158 | ⚠ | 4822 052 10479 | 47 | R | 0,33W |
| 3159 | | 4822 116 52199 | 68 | R | 0,5W |
| 3160 | | 4822 116 83883 | 470 | R | 0,5W |
| 3161 | | 4822 116 52249 | 1,8 | k | 0,5W |
| 3162 | | 4822 116 52304 | 82 | k | 0,5W |
| 3163 | | 4822 116 52303 | 8,2 | k | 0,5W |
| 3164 | | 4822 116 52256 | 2,2 | k | 0,5W |
| 3165 | | 4822 116 52283 | 4,7 | k | 0,5W |
| 3166 | | 4822 116 52257 | 22 | k | 0,5W |
| 3167 | | 4822 050 23902 | 3,9 | k | 0,6W |
| 3168 | | 4822 116 52244 | 15 | k | 0,5W |
| 3169 | | 4822 050 21003 | 10 | k | 0,6W |
| 3170 | | 4822 116 83883 | 470 | R | 0,5W |
| 3171 | | 4822 050 21008 | 1 | R | 0,6W |
| 3172 | | 4822 116 52176 | 10 | R | 0,5W |
| 3175 | | 4822 116 83872 | 220 | R | 0,5W |
| 3176 | | 4822 050 11002 | 1 | k | 0,4W |
| 3177 | | 4822 116 83864 | 10 | k | 0,5W |
| 3178 | | 4822 050 25602 | 5,6 | k | 0,6W |
| 3179 | | 4822 101 11383 | 470, 3 | R | |
| 3180 | | 4822 050 24702 | 4,7 | k | 0,6W |
| 3181 | | 4822 116 52176 | 10 | R | 0,5W |
| 3182 | | 4822 116 52176 | 10 | R | 0,5W |
| 3183 | | 4822 116 83868 | 150 | R | 0,5W |
| 3184 | | 4822 116 83864 | 10 | k | 0,5W |
| 3185 | | 4822 116 52228 | 680 | R | 0,5W |
| 3186 | | 4822 050 11002 | 1 | k | 0,4W |
| 3187 | | 4822 116 83883 | 470 | R | 0,5W |
| 3188 | | 4822 116 83874 | 220 | k | 0,5W |
| 3189 | | 4822 116 83884 | 47 | k | 0,5W |
| 3190 | | 4822 050 11002 | 1 | k | 0,4W |
| 3191 | ⚠ | 4822 052 10479 | 47 | R | 0,33W |
| 3192 | | 4822 116 52276 | 3,9 | k | 0,5W |
| 3193 | | 4822 116 52297 | 68 | k | 0,5W |
| 3194 | | 4822 116 52283 | 4,7 | k | 0,5W |
| 3195 | ⚠ | 4822 052 10478 | 4,7 | R | 0,33W |
| 3196 | | 4822 116 52228 | 680 | R | 0,5W |
| 3197 | | 4822 116 52235 | 1 | M | 0,5W |
| 3198 | | 4822 116 83874 | 220 | k | 0,5W |
| 3199 | | 4822 050 23309 | 33 | R | 0,6W |

## COILS

| | | | |
|---|---|---|---|
| 5150 | ⚠ | 4822 157 10454 | LINE FILTER CHOKE (TDK) |
| 5151 | ⚠ | 4822 146 11056 | TRANSF. SRW32ES |
| 5153 | | 4822 157 11736 | IND FXD BEAD 150MHZ 1K B |
| 5154 | | 4822 157 51462 | 10µH |
| 5155 | | 4822 157 53005 | 0,33µH 20% |
| 5156 | | 4822 157 11737 | 22µH 10% 9X9,5 |

## DIODES

| | | |
|---|---|---|
| 6151 | 4822 130 31603 | 1N4006 |
| 6152 | 4822 130 31603 | 1N4006 |
| 6153 | 4822 130 31603 | 1N4006 |
| 6154 | 4822 130 31603 | 1N4006 |
| 6155 | 4822 130 31878 | 1N4003G |
| 6156 | 4822 130 31878 | 1N4003G |
| 6157 | 4822 130 42606 | BYD33J |
| 6158 | 4822 130 31878 | 1N4003G |
| 6159 | 4822 130 31878 | 1N4003G |
| 6160 | 4822 130 31603 | 1N4006 |
| 6161 | 4822 130 31983 | BAT85 |
| 6162 | 4822 130 33948 | MTZJ5.6B |
| 6163 | 4822 130 33948 | MTZJ5.6B |
| 6164 | 4822 130 83909 | BYW98-200RL |
| 6165 | 4822 130 83909 | BYW98-200RL |
| 6166 | 5322 130 31938 | BYV27-200 |
| 6167 | 4822 130 42488 | BYD33D |
| 6168 | 4822 130 34142 | BZX79-B33 |
| 6169 | 4822 130 42488 | BYD33D |
| 6170 | 4822 130 32715 | SB340 |
| 6172 | 4822 130 30621 | 1N4148 |
| 6173 | 4822 130 30621 | 1N4148 |
| 6174 | 4822 130 30621 | 1N4148 |

## TRANSISTORS & IC's

| | | | |
|---|---|---|---|
| 7150 | | 4822 130 63722 | STP3NA60FI-1153 |
| 7151 | | 4822 209 90025 | MC44603P |
| 7152 | ⚠ | 4822 209 32126 | SOC1012T |
| 7153 | | 4822 209 81397 | TL431CLPST |
| 7154 | | 4822 130 41246 | BC327-25 |
| 7155 | | 4822 130 41246 | BC327-25 |
| 7156 | | 4822 130 40959 | BC547B |
| 7157 | | 4822 130 40959 | BC547B |
| 7158 | | 4822 130 10214 | STD17N06 |
| 7159 | | 4822 130 40959 | BC547B |
| 7160 | | 4822 130 41782 | BF422 |
| 7161 | | 4822 130 41246 | BC327-25 |

## REPAIR KITS

| | |
|---|---|
| 4822 310 11237 | POWER SUPPLY REPAIR KIT |

⚠... Safety component, use only this type

# Motherboard

## MISCELLANEOUS

| | | |
|---|---|---|
| 7 | 4822 256 10195 | REEL TABLE TACHH. DECK |
| 8 | 4822 256 10196 | TACHO-HOLDER |
| 20 | 4822 256 10197 | MOBO SENSOR-HOLDER DECK |
| 21 | 4822 256 10197 | MOBO SENSOR-HOLDER DECK |
| 22 | 4822 256 10197 | MOBO SENSOR-HOLDER DECK |
| 1001 | 4822 242 10695 | 4 433 619 MHZ |
| 1322 ▲ | 4822 071 55001 | Fuse 500mA |
| 1323 ▲ | 4822 071 51002 | Fuse 1A |
| 1324 ▲ | 4822 071 55001 | Fuse 500mA |
| 1325 ▲ | 4822 071 51002 | Fuse 1A |
| 1451 | 4822 242 10956 | 20MHZ 20P AT-49 |
| 1460 | 4822 277 11521 | SWITCH 1 ASSY DECK |
| 1461 | 4822 277 11521 | SWITCH 1 ASSY DECK |
| 1701 | 4822 242 81854 | SAW Filter G9353M for PAL BG |
| 1701 | 4822 242 10306 | OFW K9463M PAL I, P/SEC DK |
| 1701 | 4822 242 10688 | OFW K9456M for SECAM L |
| 1702 | 4822 242 10307 | OFW G3956M for PAL BG/DK |
| 1702 | 4822 242 81436 | OFW K3953M for PAL I, SEC L |
| 1703 | 4822 242 10428 | EFCT5R5YS5A, not for PAL I |
| 1703 | 4822 242 70279 | SFE6,0MB for PAL I |
| 1704 | 4822 242 10429 | EFCT6R5YS5A for PAL/SEC DK |
| 1704 | 4822 242 70279 | SFE6,0MB, for SECAM L |
| 1705 | 4822 242 72586 | TPS5,5MB-TF20, not for PAL I |
| 1705 | 4822 242 81572 | TPS6,0MB-TF21, for PAL I |
| 1706 | 4822 242 10563 | EFCT5R74YS5A |
| 1707 | 4822 242 10754 | EFCT6R25YS5A |
| 1709 | 4822 210 10833 | BOOSTER PLT for SECAM L |
| 1709 | 4822 210 10832 | Tumod VHF/UHF, PAL-B/G |
| 1709 | 4822 210 10834 | Tumod VHF/UHF PAL I |
| 1709 | 4822 210 10835 | Tumod VHF/UHF Modul. D/K |

when changing Tumod order also spring 4822 492 11687

| | | |
|---|---|---|
| 1911 | 4822 267 10364 | CONN. 9P |
| 1942 | 4822 267 10871 | 17POL. FEM. |
| 1944 | 4822 267 51255 | 14 P |
| 1946 | 4822 267 10366 | CAPSTAN-MOBO-SOCKEL |
| 1947 | 4822 267 10957 | CONN. 3P |
| 1948 | 4822 267 41062 | 6 pin |
| 1951 | 4822 265 11422 | SCART CONN BLACK 7133 |
| 1952 | 4822 264 10346 | SCART CONN. BLUE 7135D |
| 1954 | 4822 265 41077 | CINCH connector |
| 1956 | 4822 267 10953 | CONN. 7P |
| 1957 | 4822 267 10584 | CONN. 1P |
| 1960 | 4822 267 10953 | CONN. 7P |
| 1961 | 4822 267 10954 | CONN. 5P |
| 1964 | 5322 268 90415 | B2B-PH-K |
| 1971 | 4822 242 82059 | ZAK2863 (10MHZ) |
| 1991 | 4822 267 10957 | CONN. 3P |

## CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2000 | 4822 126 10002 | 100 | nF | 25V |
| 2001 | 4822 122 33177 | 10 | nF | 50V |
| 2002 | 4822 122 33177 | 10 | nF | 50V |
| 2003 | 4822 122 33177 | 10 | nF | 50V |
| 2004 | 4822 126 13836 | 10 | A | 50V |
| 2005 | 4822 126 13836 | 10 | A | 50V |
| 2006 | 4822 122 33177 | 10 | nF | 50V |
| 2007 | 4822 122 33177 | 10 | nF | 50V |
| 2008 | 4822 126 10002 | 100 | nF | 25V |
| 2009 | 4822 122 33177 | 10 | nF | 50V |
| 2010 | 5322 122 31873 | 2,7 | pF | 100V |
| 2011 | 4822 126 10002 | 100 | nF | 25V |
| 2012 | 4822 126 13751 | 47 | nF | 63V |
| 2013 | 5322 122 32654 | 22 | nF | 63V |
| 2014 | 4822 126 10002 | 100 | nF | 25V |
| 2015 | 4822 124 22651 | 1,0 | μF | 50V |
| 2016 | 4822 126 13296 | 100 | nF | 16V |
| 2017 | 4822 126 13836 | 100 | A | 16V |
| 2018 | 4822 124 21732 | 10 | μF | 25V |
| 2019 | 4822 124 21732 | 10 | μF | 25V |
| 2020 | 4822 122 33177 | 10 | nF | 50V |
| 2021 | 4822 124 21732 | 10 | μF | 25V |
| 2022 | 4822 126 10002 | 100 | nF | 25V |
| 2023 | 4822 126 10002 | 100 | nF | 25V |
| 2024 | 4822 124 11946 | 22 | μF | 16V |
| 2025 | 4822 122 33177 | 10 | nF | 50V |
| 2026 | 4822 122 33177 | 10 | nF | 50V |
| 2027 | 4822 124 40246 | 4,7 | μF | |
| 2028 | 4822 122 33177 | 10 | nF | 50V |
| 2029 | 4822 126 13836 | 1 | μF | 16V |
| 2030 | 4822 124 22651 | 1,0 | μF | 50V |
| 2032 | 4822 122 33177 | 10 | nF | 50V |
| 2033 | 4822 122 33177 | 10 | nF | 50V |
| 2034 | 4822 126 10002 | 100 | nF | 25V |
| 2035 | 4822 124 11946 | 22 | μF | 16V |
| 2036 | 4822 126 14124 | 220 | pF | |
| 2037 | 5322 122 32658 | 22 | pF | 50V |
| 2038 | 4822 126 13222 | 390 | pF | 63V |
| 2039 | 4822 124 12052 | 220 | μF | 6,3V |
| 2040 | 4822 126 13695 | 82 | pF | 63V |
| 2041 | 4822 126 10002 | 100 | nF | 25V |
| 2042 | 5322 122 32658 | 22 | pF | 50V |
| 2043 | 5322 122 32966 | 39 | pF | 50V |
| 2044 | 4822 126 10002 | 100 | nF | 25V |
| 2045 | 4822 122 33177 | 10 | nF | 50V |
| 2047 | 4822 124 22726 | 4,7 | μF | 35V |
| 2049 | 4822 126 13691 | 27 | pF | 63V |
| 2050 | 4822 122 33177 | 10 | nF | 50V |
| 2052 | 4822 122 33575 | 220 | pF | 50V |
| 2053 | 4822 124 80231 | 47 | μF | 16V |
| 2054 | 4822 124 40246 | 4,7 | μF | |
| 2055 | 4822 124 80231 | 47 | μF | 16V |
| 2056 | 4822 124 40246 | 4,7 | μF | |
| 2057 | 4822 122 33797 | 47 | nF | 50V |
| 2060 | 4822 126 10002 | 100 | nF | 25V |
| 2061 | 4822 126 10002 | 100 | nF | 25V |
| 2062 | 4822 126 13486 | 15 | pF | 63V |
| 2063 | 4822 122 33177 | 10 | nF | 50V |
| 2064 | 4822 122 33575 | 220 | pF | 50V |
| 2065 | 4822 122 33177 | 10 | nF | 50V |
| 2066 | 4822 126 13694 | 68 | pF | 63V |
| 2067 | 5322 122 33538 | 150 | pF | 63V |
| 2068 | 4822 122 33177 | 10 | nF | 50V |
| 2069 | 5322 122 32658 | 22 | pF | 50V |
| 2070 | 5322 122 32531 | 100 | pF | 50V |
| 2071 | 5322 122 34123 | 1 | nF | 50V |
| 2072 | 5322 122 34123 | 1 | nF | 50V |
| 2073 | 5322 122 32659 | 33 | pF | 50V |
| 2074 | 4822 122 33177 | 10 | nF | 50V |
| 2075 | 4822 122 33177 | 10 | nF | 50V |
| 2076 | 4822 122 33177 | 10 | nF | 50V |
| 2077 | 4822 126 10002 | 100 | nF | 25V |
| 2078 | 4822 122 33177 | 10 | nF | 50V |
| 2079 | 5322 122 34123 | 1 | nF | 50V |
| 2080 | 4822 122 33177 | 10 | nF | 50V |
| 2081 | 4822 126 10002 | 100 | nF | 25V |
| 2082 | 5322 122 32269 | 6,8 | pF | 50V |
| 2083 | 4822 126 13692 | 47 | pF | 63V |
| 2084 | 4822 122 33575 | 220 | pF | 50V |
| 2085 | 5322 122 34123 | 1 | nF | 50V |
| 2086 | 4822 126 10002 | 100 | nF | 25V |
| 2087 | 4822 126 13695 | 82 | pF | 63V |
| 2088 | 4822 122 33575 | 220 | pF | 50V |
| 2089 | 4822 126 13691 | 27 | pF | 63V |
| 2090 | 4822 126 13691 | 27 | pF | 63V |
| 2091 | 4822 126 13695 | 82 | pF | 63V |
| 2092 | 4822 126 13695 | 82 | pF | 63V |
| 2093 | 4822 126 13692 | 47 | pF | 63V |
| 2094 | 4822 126 10002 | 100 | nF | 25V |
| 2095 | 4822 126 13836 | 1 | μF | 16V |
| 2099 | 4822 126 10002 | 100 | nF | 25V |
| 2101 | 5322 122 32531 | 100 | pF | 50V |
| 2104 | 5322 122 32658 | 22 | pF | 50V |
| 2105 | 4822 126 13061 | 220 | nF | 25V |
| 2106 | 4822 124 80231 | 47 | μF | 16V |
| 2107 | 4822 122 33177 | 10 | nF | 50V |
| 2108 | 5322 122 32654 | 22 | nF | 63V |
| 2110 | 4822 122 33177 | 10 | nF | 50V |
| 2111 | 4822 122 33177 | 10 | nF | 50V |
| 2112 | 4822 122 33177 | 10 | nF | 50V |
| 2113 | 4822 122 33177 | 10 | nF | 50V |
| 2114 | 4822 122 33177 | 10 | nF | 50V |
| 2115 | 4822 122 33177 | 10 | nF | 50V |
| 2116 | 4822 122 33177 | 10 | nF | 50V |
| 2117 | 4822 122 33177 | 10 | nF | 50V |
| 2118 | 4822 122 33177 | 10 | nF | 50V |
| 2122 | 4822 126 13061 | 220 | nF | 25V |
| 2123 | 4822 122 33177 | 10 | nF | 50V |
| 2124 | 4822 122 33177 | 10 | nF | 50V |

▲ ... Safety component, use only this type

# Motherboard

| | | | | |
|---|---|---|---|---|
| 2125 | 4822 124 80231 | 47 | µF | 16V |
| 2126 | 5322 122 32659 | 33 | pF | 50V |
| 2321 | 4822 126 10002 | 100 | nF | 25V |
| 2322 | 4822 126 10002 | 100 | nF | 25V |
| 2323 | 4822 124 22263 | 220 | µF | 25V |
| 2324 | 4822 124 22263 | 220 | µF | 25V |
| 2325 | 5322 121 42661 | 330 | nF | 63V |
| 2326 | 4822 124 22263 | 220 | µF | 25V |
| 2328 | 4822 124 22726 | 4,7 | µF | 35V |
| 2400 | 4822 124 22726 | 4,7 | µF | 35V |
| 2401 | 4822 126 10002 | 100 | nF | 25V |
| 2402 | 5322 122 32531 | 100 | pF | 50V |
| 2403 | 5322 122 32531 | 100 | pF | 50V |
| 2404 | 4822 122 33175 | 2,2 | nF | 50V |
| 2405 | 4822 122 33575 | 220 | pF | 50V |
| 2406 | 4822 124 22726 | 4,7 | µF | 35V |
| 2407 | 4822 122 33575 | 220 | pF | 50V |
| 2408 | 4822 126 13836 | 1 | µF | 50V |
| 2409 | 4822 122 33575 | 220 | pF | 50V |
| 2411 | 4822 122 33175 | 2,2 | nF | 50V |
| 2412 | 4822 122 33177 | 10 | nF | 50V |
| 2451 | 4822 126 10002 | 100 | nF | 25V |
| 2452 | 4822 124 11946 | 22 | µF | 16V |
| 2453 | 4822 126 13836 | 1 | µF | 16V |
| 2454 | 4822 126 10002 | 100 | nF | 25V |
| 2455 | 4822 126 10002 | 100 | nF | 25V |
| 2456 | 4822 126 13691 | 27 | pF | 63V |
| 2457 | 5322 122 32659 | 33 | pF | 50V |
| 2458 | 4822 122 33177 | 10 | nF | 50V |
| 2459 | 4822 126 13691 | 27 | pF | 63V |
| 2461 | 5322 126 10223 | 4,7 | nF | 63V |
| 2462 | 4822 124 81029 | 100 | µF | 25V |
| 2463 | 4822 122 33177 | 10 | nF | 50V |
| 2471 | 4822 124 80231 | 47 | µF | 16V |
| 2472 | 4822 124 22726 | 4,7 | µF | 35V |
| 2473 | 5322 126 10223 | 4,7 | nF | 63V |
| 2474 | 4822 122 33175 | 2,2 | nF | 50V |
| 2475 | 4822 124 80231 | 47 | µF | 16V |
| 2476 | 4822 126 12105 | 33 | nF | 63V |
| 2477 | 4822 126 10002 | 100 | nF | 25V |
| 2478 | 4822 122 33177 | 10 | nF | 50V |
| 2479 | 4822 122 33177 | 10 | nF | 50V |
| 2480 | 4822 124 22726 | 4,7 | µF | 35V |
| 2482 | 4822 126 10002 | 100 | nF | 25V |
| 2483 | 5322 122 32654 | 22 | nF | 63V |
| 2484 | 4822 124 80854 | 1 | µF | 50V |
| 2485 | 4822 124 80854 | 1 | µF | 50V |
| 2486 | 4822 124 80854 | 1 | µF | 50V |
| 2487 | 4822 126 10002 | 100 | nF | 25V |
| 2489 | 4822 124 22263 | 220 | µF | 25V |
| 2490 | 4822 126 10002 | 100 | nF | 25V |
| 2491 | 5322 122 32531 | 100 | pF | 50V |
| 2492 | 5322 122 32654 | 22 | nF | 63V |
| 2493 | 4822 122 33177 | 10 | nF | 50V |
| 2494 | 4822 126 10002 | 100 | nF | 25V |
| 2495 | 4822 122 33797 | 47 | nF | 50V |
| 2496 | 5322 122 32654 | 22 | nF | 63V |
| 2497 | 4822 122 33177 | 10 | nF | 50V |
| 2501 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2502 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2503 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2504 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2505 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2506 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2507 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2508 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2509 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2510 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2511 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2512 | 4822 116 10056 | VDR 0805 1MA/8V MAX 21V | | |
| 2513 | 4822 124 22726 | 4,7 | µF | 35V |
| 2514 | 4822 124 80231 | 47 | µF | 16V |
| 2515 | 4822 126 10002 | 100 | nF | 25V |
| 2516 | 4822 126 10002 | 100 | nF | 25V |
| 2517 | 4822 126 10002 | 100 | nF | 25V |
| 2518 | 4822 126 10002 | 100 | nF | 25V |
| 2519 | 4822 126 10002 | 100 | nF | 25V |
| 2520 | 4822 126 10002 | 100 | nF | 25V |
| 2521 | 4822 126 10002 | 100 | nF | 25V |
| 2522 | 4822 126 10002 | 100 | nF | 25V |
| 2523 | 4822 124 80231 | 47 | µF | 16V |

| | | | | |
|---|---|---|---|---|
| 2601 | 4822 126 10002 | 100 | nF | 25V |
| 2602 | 4822 124 11946 | 22 | µF | 16V |
| 2603 | 4822 124 80231 | 47 | µF | 16V |
| 2604 | 4822 126 13836 | 1 | µF | 16V |
| 2605 | 4822 122 33177 | 10 | nF | 50V |
| 2606 | 4822 126 10002 | 100 | nF | 25V |
| 2607 | 4822 124 80231 | 47 | µF | 16V |
| 2608 | 4822 126 10002 | 100 | nF | 25V |
| 2609 | 4822 124 80231 | 47 | µF | 16V |
| 2610 | 4822 126 13188 | 15 | nF | 63V |
| 2611 | 4822 126 14127 | 39 | nF | 50V |
| 2612 | 4822 122 33175 | 2,2 | nF | 50V |
| 2613 | 4822 124 21732 | 10 | µF | 25V |
| 2614 | 4822 126 10002 | 100 | nF | 25V |
| 2615 | 4822 124 80231 | 47 | µF | 16V |
| 2616 | 4822 124 22652 | 2,2 | µF | 50V |
| 2617 | 4822 126 13836 | 1 | µF | 16V |
| 2618 | 4822 122 33177 | 10 | nF | 50V |
| 2619 | 5322 122 34123 | 1 | nF | 50V |
| 2620 | 5322 122 31863 | 330 | pF | 50V |
| 2621 | 5322 122 34123 | 1 | nF | 50V |
| 2622 | 4822 122 33806 | 820 | pF | 63V |
| 2623 | 4822 124 21732 | 10 | µF | 25V |
| 2624 | 4822 126 13751 | 47 | nF | 63V |
| 2625 | 4822 121 51574 | 12 | nF | 50V |
| 2626 | 4822 124 11946 | 22 | µF | 16V |
| 2641 | 4822 124 80231 | 47 | µF | 16V |
| 2642 | 5322 122 34123 | 1 | nF | 50V |
| 2643 | 4822 124 80231 | 47 | µF | 16V |
| 2644 | 4822 121 43873 | 27 | nF | 50V |
| 2645 | 4822 126 12105 | 33 | nF | 63V |
| 2646 | 4822 121 41857 | 10 | nF | 250V |
| 2651 | 4822 124 22726 | 4,7 | µF | 35V |
| 2652 | 4822 122 33177 | 10 | nF | 50V |
| 2653 | 4822 126 13296 | 100 | nF | 16V |
| 2654 | 5322 122 32654 | 22 | nF | 63V |
| 2655 | 4822 124 22652 | 2,2 | µF | 50V |
| 2656 | 5322 122 32531 | 100 | pF | 50V |
| 2657 | 4822 126 13296 | 100 | nF | 16V |
| 2658 | 4822 122 33891 | 3,3 | nF | 63V |
| 2659 | 4822 124 80231 | 47 | µF | 16V |
| 2660 | 4822 124 21732 | 10 | µF | 25V |
| 2661 | 4822 126 13296 | 100 | nF | 16V |
| 2662 | 4822 122 33177 | 10 | nF | 50V |
| 2663 | 4822 122 33891 | 3,3 | nF | 63V |
| 2664 | 4822 124 80231 | 47 | µF | 16V |
| 2665 | 4822 124 21732 | 10 | µF | 25V |
| 2666 | 5322 122 34123 | 1 | nF | 50V |
| 2668 | 4822 126 13061 | 220 | nF | 25V |
| 2669 | 4822 126 13061 | 220 | nF | 25V |
| 2671 | 4822 124 22651 | 1,0 | µF | 50V |
| 2672 | 4822 124 22651 | 1,0 | µF | 50V |
| 2673 | 4822 124 21732 | 10 | µF | 25V |
| 2674 | 4822 126 13061 | 220 | nF | 25V |
| 2675 | 4822 126 13061 | 220 | nF | 25V |
| 2676 | 4822 124 21732 | 10 | µF | 25V |
| 2677 | 4822 126 13061 | 220 | nF | 25V |
| 2678 | 4822 126 13061 | 220 | nF | 25V |
| 2679 | 4822 124 22651 | 1,0 | µF | 50V |
| 2680 | 4822 124 21732 | 10 | µF | 25V |
| 2681 | 4822 124 22651 | 1,0 | µF | 50V |
| 2682 | 4822 126 13061 | 220 | nF | 25V |
| 2683 | 4822 124 21732 | 10 | µF | 25V |
| 2684 | 4822 126 13836 | 1 | µF | 16V |
| 2685 | 4822 124 21732 | 10 | µF | 25V |
| 2686 | 4822 126 13061 | 220 | nF | 25V |
| 2687 | 4822 126 10002 | 100 | nF | 25V |
| 2701 | 4822 124 81151 | 22 | µF | 50V |
| 2702 | 4822 126 10002 | 100 | nF | 25V |
| 2703 | 4822 126 10002 | 100 | nF | 25V |
| 2704 | 4822 126 13836 | 1 | µF | 16V |
| 2705 | 4822 126 13061 | 220 | nF | 25V |
| 2706 | 4822 126 14319 | 8,2 | pF | 50V |
| 2707 | 5322 122 34123 | 1 | nF | 50V |
| 2708 | 4822 126 13836 | 1 | µF | 16V |
| 2709 | 4822 122 33177 | 10 | nF | 50V |
| 2710 | 4822 122 33575 | 220 | pF | 50V |
| 2713 | 4822 124 11946 | 22 | µF | 16V |
| 2715 | 5322 122 33861 | 120 | pF | 50V |
| 2716 | 4822 126 10002 | 100 | nF | 25V |
| 2717 | 4822 124 22726 | 4,7 | µF | 35V |

# Motherboard

| | | | | |
|---|---|---|---|---|
| 2718 | 4822 126 10002 | 100 | nF | 25V |
| 2719 | 5322 122 32268 | 470 | pF | 50V |
| 2720 | 4822 126 14498 | 10 | µF | |
| 2721 | 4822 126 13838 | 100 | nF | |
| 2722 | 4822 124 11946 | 22 | µF | 16V |
| 2723 | 4822 124 22652 | 2,2 | µF | 50V |
| 2725 | 4822 124 22652 | 2,2 | µF | 50V |
| 2726 | 4822 126 10002 | 100 | nF | 25V |
| 2730 | 4822 126 13836 | 1 | µF | 16V |
| 2734 | 5322 124 41379 | 2,2 | µF | 50V |
| 2771 | 4822 124 21732 | 10 | µF | 25V |
| 2772 | 4822 122 33177 | 10 | nF | 50V |
| 2773 | 4822 126 10002 | 100 | nF | 25V |
| 2774 | 4822 126 10002 | 100 | nF | 25V |
| 2775 | 4822 122 33177 | 10 | nF | 50V |
| 2776 | 4822 124 41584 | 100 | µF | 10V |
| 2777 | 5322 126 10184 | 680 | pF | |
| 2778 | 5322 122 32531 | 100 | pF | 50V |
| 2779 | 4822 122 33177 | 10 | nF | 50V |
| 2780 | 4822 126 13836 | 1 | µF | 16V |
| 2781 | 4822 126 13836 | 1 | µF | 16V |
| 2782 | 4822 124 40246 | 4,7 | µF | |
| 2783 | 4822 124 40246 | 4,7 | µF | |
| 2784 | 4822 126 13836 | 1 | µF | 16V |
| 2801 | 5322 122 32448 | 10 | pF | 50V |
| 2802 | 4822 126 10002 | 100 | nF | 25V |
| 2803 | 4822 126 10002 | 100 | nF | 25V |
| 2804 | 4822 124 80231 | 47 | µF | 16V |
| 2805 | 4822 126 13836 | 1 | µF | 16V |
| 2806 | 5322 122 32448 | 10 | pF | 50V |
| 2807 | 5322 126 10184 | 680 | pF | |
| 2808 | 4822 126 13836 | 1 | µF | 16V |
| 2809 | 4822 126 13836 | 1 | µF | 16V |
| 2810 | 4822 126 13836 | 1 | µF | 16V |
| 2811 | 4822 122 33177 | 10 | nF | 50V |
| 2812 | 4822 124 80231 | 47 | µF | 16V |
| 2813 | 4822 126 10002 | 100 | nF | 25V |
| 2814 | 4822 122 33177 | 10 | nF | 50V |
| 2815 | 4822 122 33177 | 10 | nF | 50V |
| 2816 | 4822 122 33177 | 10 | nF | 50V |
| 2817 | 4822 126 10002 | 100 | nF | 25V |
| 2818 | 4822 122 33177 | 10 | nF | 50V |
| 2819 | 4822 122 33177 | 10 | nF | 50V |
| 2820 | 5322 126 10223 | 4,7 | nF | 63V |
| 2821 | 4822 122 33177 | 10 | nF | 50V |
| 2822 | 4822 124 40246 | 4,7 | µF | |
| 2823 | 4822 124 80231 | 47 | µF | 16V |
| 2824 | 4822 126 13836 | 1 | µF | 16V |
| 2825 | 4822 122 33177 | 10 | nF | 50V |
| 2826 | 4822 122 33177 | 10 | nF | 50V |
| 2827 | 4822 124 21732 | 10 | µF | 25V |
| 2828 | 5322 126 10511 | 1 | nF | 50V |
| 2829 | 5322 126 10511 | 1 | nF | 50V |
| 2830 | 4822 126 10002 | 100 | nF | 25V |
| 2831 | 4822 124 21732 | 10 | µF | 25V |
| 2832 | 4822 122 33175 | 2,2 | nF | 50V |
| 2833 | 4822 122 33175 | 2,2 | nF | 50V |
| 2834 | 4822 126 10326 | 180 | pF | 63V |
| 2835 | 4822 126 10326 | 180 | pF | 63V |
| 2836 | 4822 126 13836 | 1 | µF | 16V |
| 2837 | 4822 126 13836 | 1 | µF | 16V |
| 2839 | 4822 124 12052 | 220 | µF | 6,3V |
| 2841 | 4822 124 12052 | 220 | µF | 6,3V |
| 2845 | 4822 122 33175 | 2,2 | nF | 50V |
| 2846 | 4822 126 13836 | 1 | µF | 16V |
| 2847 | 5322 122 32531 | 100 | pF | 50V |
| 2849 | 4822 126 10002 | 100 | nF | 25V |
| 2850 | 5322 121 42386 | 100 | nF | 63V |
| 2851 | 4822 124 80231 | 47 | µF | 16V |
| 2852 | 4822 126 10002 | 100 | nF | 25V |
| 2853 | 4822 126 10002 | 100 | nF | 25V |
| 2854 | 4822 126 13482 | 470 | nF | 16V |
| 2855 | 4822 126 13296 | 100 | nF | 16V |
| 2856 | 4822 126 13751 | 47 | nF | 63V |
| 2857 | 5322 122 33861 | 120 | pF | 50V |
| 2860 | 5322 122 34123 | 1 | nF | 50V |
| 2863 | 4822 126 13061 | 220 | nF | 25V |
| 2864 | 5322 122 33244 | 8,2 | pF | 50V |
| 2865 | 5322 122 32658 | 22 | pF | 50V |
| 2866 | 4822 126 10002 | 100 | nF | 25V |
| 2867 | 5322 122 32658 | 22 | pF | 50V |
| 2868 | 5322 126 10184 | 680 | pF | |
| 2869 | 4822 126 13836 | 1 | µF | 16V |

## *RESISTORS*

| | | | | |
|---|---|---|---|---|
| 3001 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3002 | 4822 051 20182 | 1,8 | k | 0,1W |
| 3003 | 4822 051 10102 | 1 | k | 0,25W |
| 3004 | 4822 051 20822 | 8,2 | k | 0,1W |
| 3005 | 4822 051 10102 | 1 | k | 0,25W |
| 3006 | 4822 116 52289 | 5,6 | k | 0,5W |
| 3008 | 4822 116 83884 | 47 | k | 0,5W |
| 3009 | 4822 051 20101 | 100 | R | 0,1W |
| 3010 | 4822 116 83884 | 47 | k | 0,5W |
| 3011 | 4822 050 11002 | 1 | k | 0,4W |
| 3012 | 4822 116 83882 | 39 | k | 0,5W |
| 3013 | 4822 051 20105 | 1 | M | 0,1W |
| 3017 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3019 | 4822 117 10361 | 680 | R | 0,1W |
| 3020 | 4822 117 11721 | 1,3 | k | 0.1W |
| 3021 | 4822 051 20224 | 220 | k | 0,1W |
| 3022 | 4822 051 20154 | 150 | k | 0,1W |
| 3023 | 4822 051 20101 | 100 | R | 0,1W |
| 3024 | 4822 117 10833 | 10 | k | 0,1W |
| 3025 | 4822 117 11504 | 270 | R | 0.1W |
| 3026 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3027 | 4822 051 20471 | 470 | R | 0,1W |
| 3029 | 4822 051 20471 | 470 | R | 0,1W |
| 3030 | 4822 116 52228 | 680 | R | 0,5W |
| 3031 | 4822 051 10102 | 1 | k | 0,25W |
| 3032 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3034 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3035 | 4822 116 52175 | 100 | R | 0,5W |
| 3037 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3038 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3040 | 4822 116 52228 | 680 | R | 0,5W |
| 3041 | 4822 116 52228 | 680 | R | 0,5W |
| 3042 | 4822 116 83883 | 470 | R | 0,5W |
| 3046 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3047 | 4822 116 83884 | 47 | k | 0,5W |
| 3048 | 4822 116 52234 | 100 | k | 0,5W |
| 3059 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3060 | 4822 116 52195 | 47 | R | 0,5W |
| 3061 | 4822 116 52228 | 680 | R | 0,5W |
| 3062 | 4822 116 83864 | 10 | k | 0,5W |
| 3063 | 4822 116 52226 | 560 | R | 0,5W |
| 3064 | 4822 116 52226 | 560 | R | 0,5W |
| 3065 | 4822 050 11002 | 1 | k | 0,4W |
| 3066 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3067 | 4822 116 83881 | 390 | R | 0,5W |
| 3068 | 4822 050 11002 | 1 | k | 0,4W |
| 3069 | 4822 116 52231 | 820 | R | 0,5W |
| 3070 | 4822 050 11002 | 1 | k | 0,4W |
| 3071 | 4822 116 52219 | 330 | R | 0,5W |
| 3072 | 4822 116 52269 | 3,3 | k | 0,5W |
| 3073 | 4822 116 52207 | 1,2 | k | 0,5W |
| 3074 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3075 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3076 | 4822 100 12157 | 10 | k | |
| 3077 | 4822 116 52303 | 8,2 | k | 0,5W |
| 3078 | 4822 050 11002 | 1 | k | 0,4W |
| 3079 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3080 | 4822 116 83864 | 10 | k | 0,5W |
| 3081 | 4822 116 52243 | 1,5 | k | 0,5W |
| 3082 | 4822 116 52251 | 18 | k | 0,5W |
| 3083 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3084 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3085 | 4822 051 10102 | 1 | k | 0,25W |
| 3086 | 4822 116 52271 | 33 | k | 0,5W |
| 3087 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3088 | 4822 050 11002 | 1 | k | 0,4W |
| 3089 | 4822 116 52249 | 1,8 | k | 0,5W |
| 3090 | 4822 116 83864 | 10 | k | 0,5W |
| 3091 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3092 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3093 | 4822 117 10833 | 10 | k | 0,1W |
| 3094 | 4822 117 10833 | 10 | k | 0,1W |
| 3095 | 4822 116 52175 | 100 | R | 0,5W |
| 3096 | 4822 116 52175 | 100 | R | 0,5W |

# Motherboard

| | | | | |
|---|---|---|---|---|
| 3097 | 4822 116 52175 | 100 | R | 0,5W |
| 3101 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3102 | 4822 051 20561 | 560 | R | 0,1W |
| 3103 | 4822 051 20561 | 560 | R | 0,1W |
| 3104 | 4822 051 20112 | 1,1 | k | 0,1W |
| 3105 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3106 | 4822 051 20153 | 15 | k | 0,1W |
| 3107 | 4822 051 20331 | 330 | R | 0,1W |
| 3108 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3109 | 4822 051 20471 | 470 | R | 0,1W |
| 3110 | 4822 051 20331 | 330 | R | 0,1W |
| 3111 | 4822 051 20224 | 220 | k | 0,1W |
| 3112 | 4822 117 10833 | 10 | k | 0,1W |
| 3113 | 4822 051 20331 | 330 | R | 0,1W |
| 3114 | 4822 117 12605 | 27 | k | 0,1W |
| 3115 | 4822 051 20568 | 5,6 | R | 0,1W |
| 3116 | 4822 117 11383 | 12 | k | 0,1W |
| 3118 | 4822 100 12157 | 10 | k | |
| 3119 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3120 | 4822 051 10102 | 1 | k | 0,25W |
| 3321 | 4822 116 83874 | 220 | k | 0,5W |
| 3322 | 4822 116 52195 | 47 | R | 0,5W |
| 3323 | 4822 117 10833 | 10 | k | 0,1W |
| 3325 | 4822 051 20224 | 220 | k | 0,1W |
| 3326 | 4822 116 83872 | 220 | R | 0,5W |
| 3327 | 4822 116 83872 | 220 | R | 0,5W |
| 3328 | 4822 050 11002 | 1 | k | 0,4W |
| 3329 | 4822 116 83872 | 220 | R | 0,5W |
| 3330 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3331 | 4822 116 52234 | 100 | k | 0,5W |
| 3332 | 4822 117 10833 | 10 | k | 0,1W |
| 3334 | 4822 117 10833 | 10 | k | 0,1W |
| 3335 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3336 | 4822 116 83864 | 10 | k | 0,5W |
| 3337 | 4822 051 20104 | 100 | k | 0,1W |
| 3340 | 4822 050 11002 | 1 | k | 0,4W |
| 3341 | 4822 051 20101 | 100 | R | 0,1W |
| 3342 | 4822 116 52175 | 100 | R | 0,5W |
| 3344 | 4822 116 52175 | 100 | R | 0,5W |
| 3345 | 4822 116 83864 | 10 | k | 0,5W |
| 3351 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3352 | 4822 050 11002 | 1 | k | 0,4W |
| 3353 | 4822 050 11002 | 1 | k | 0,4W |
| 3354 | 4822 117 10834 | 47 | k | 0,1W |
| 3355 | 4822 116 83864 | 10 | k | 0,5W |
| 3356 | 4822 050 11002 | 1 | k | 0,4W |
| 3357 | 4822 116 83884 | 47 | k | 0,5W |
| 3358 | 4822 050 11002 | 1 | k | 0,4W |
| 3363 | 4822 116 83881 | 390 | R | 0,5W |
| 3364 | 4822 116 52264 | 27 | k | 0,5W |
| 3370 | 4822 050 11002 | 1 | k | 0,4W |
| 3371 ▲ | 4822 052 10228 | 2,2 | R | 0,33W |
| 3372 | 4822 051 20223 | 22 | k | 0,1W |
| 3373 | 4822 051 20471 | 470 | R | 0,1W |
| 3374 | 4822 117 11503 | 220 | R | 0.1W |
| 3375 | 4822 117 10833 | 10 | k | 0,1W |
| 3376 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3377 | 4822 116 80176 | 1 | R | 0,5W |
| 3378 | 4822 117 10834 | 47 | k | 0,1W |
| 3379 | 4822 051 20392 | 3,9 | k | 0,1W |
| 3380 | 4822 116 83876 | 270 | R | 0,5W |
| 3381 | 4822 116 52289 | 5,6 | k | 0,5W |
| 3382 | 4822 117 10833 | 10 | k | 0,1W |
| 3383 | 4822 116 83864 | 10 | k | 0,5W |
| 3384 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3385 | 4822 051 20223 | 22 | k | 0,1W |
| 3386 | 4822 116 52264 | 27 | k | 0,5W |
| 3387 | 4822 117 11149 | 82 | k | 0,1W |
| 3388 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3389 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3390 | 4822 051 20471 | 470 | R | 0,1W |
| 3391 | 4822 051 20225 | 2,2 | M | 0,1W |
| 3392 | 4822 051 20104 | 100 | k | 0,1W |
| 3393 | 4822 051 20104 | 100 | k | 0,1W |
| 3394 | 4822 117 10834 | 47 | k | 0,1W |
| 3395 | 4822 116 52175 | 100 | R | 0,5W |
| 3396 | 4822 116 52175 | 100 | R | 0,5W |
| 3397 | 4822 051 20101 | 100 | R | 0,1W |
| 3398 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3399 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3403 | 4822 051 20101 | 100 | R | 0,1W |

| | | | | |
|---|---|---|---|---|
| 3404 | 4822 051 20273 | 27 | k | 0,1W |
| 3405 | 4822 117 11507 | 6,8 | k | 0,1W |
| 3406 | 4822 051 20008 | 0 | R | 0,1W |
| 3407 | 4822 051 20101 | 100 | R | 0,1W |
| 3409 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3410 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3413 | 4822 116 52175 | 100 | R | 0,5W |
| 3414 | 4822 116 52175 | 100 | R | 0,5W |
| 3415 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3416 | 4822 117 11148 | 56 | k | 0,1W |
| 3417 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3419 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3420 | 4822 116 52175 | 100 | R | 0,5W |
| 3422 | 4822 117 10834 | 47 | k | 0,1W |
| 3423 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3424 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3425 | 4822 051 20333 | 33 | k | 0,1W |
| 3426 ▲ | 4822 052 10109 | 10 | R | 0,33W |
| 3427 | 4822 117 11503 | 220 | R | 0.1W |
| 3428 | 4822 050 11002 | 1 | k | 0,4W |
| 3429 | 4822 117 10833 | 10 | k | 0,1W |
| 3430 | 4822 051 10102 | 1 | k | 0,25W |
| 3431 ▲ | 4822 052 10109 | 10 | R | 0,33W |
| 3432 | 4822 116 83864 | 10 | k | 0,5W |
| 3433 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3434 | 4822 116 83864 | 10 | k | 0,5W |
| 3435 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3436 | 4822 116 52175 | 100 | R | 0,5W |
| 3437 | 4822 116 52175 | 100 | R | 0,5W |
| 3438 | 4822 117 10834 | 47 | k | 0,1W |
| 3439 | 4822 116 52175 | 100 | R | 0,5W |
| 3440 | 4822 117 10833 | 10 | k | 0,1W |
| 3441 | 4822 116 52234 | 100 | k | 0,5W |
| 3442 | 4822 116 83876 | 270 | R | 0,5W |
| 3443 | 4822 116 83876 | 270 | R | 0,5W |
| 3444 | 4822 116 83876 | 270 | R | 0,5W |
| 3445 | 4822 116 83876 | 270 | R | 0,5W |
| 3446 | 4822 117 10833 | 10 | k | 0,1W |
| 3447 | 4822 116 52175 | 100 | R | 0,5W |
| 3448 | 4822 116 52175 | 100 | R | 0,5W |
| 3449 | 4822 117 10833 | 10 | k | 0,1W |
| 3450 | 4822 117 10833 | 10 | k | 0,1W |
| 3451 | 4822 117 10833 | 10 | k | 0,1W |
| 3452 | 4822 051 10102 | 1 | k | 0,25W |
| 3453 | 4822 116 83864 | 10 | k | 0,5W |
| 3454 | 4822 117 11454 | 820 | R | 0,1W |
| 3455 | 4822 117 10833 | 10 | k | 0,1W |
| 3456 | 4822 116 83864 | 10 | k | 0,5W |
| 3457 | 4822 051 20471 | 470 | R | 0,1W |
| 3458 | 4822 051 10102 | 1 | k | 0,25W |
| 3459 | 4822 117 10834 | 47 | k | 0,1W |
| 3460 | 4822 051 20472 | 4,7 | k | 0,1W |
| 3461 | 4822 117 11148 | 56 | k | 0,1W |
| 3462 | 4822 051 20223 | 22 | k | 0,1W |
| 3463 | 4822 051 20223 | 22 | k | 0,1W |
| 3464 | 4822 117 10834 | 47 | k | 0,1W |
| 3465 | 4822 050 11002 | 1 | k | 0,4W |
| 3466 | 4822 116 52234 | 100 | k | 0,5W |
| 3467 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3470 | 4822 116 83864 | 10 | k | 0,5W |
| 3471 | 4822 050 11002 | 1 | k | 0,4W |
| 3472 | 4822 117 11383 | 12 | k | 0,1W |
| 3473 | 4822 116 52238 | 12 | k | 0,5W |
| 3474 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3475 | 4822 051 20333 | 33 | k | 0,1W |
| 3476 | 4822 117 10834 | 47 | k | 0,1W |
| 3477 | 4822 117 10834 | 47 | k | 0,1W |
| 3478 | 4822 117 10833 | 10 | k | 0,1W |
| 3479 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3480 | 4822 050 11002 | 1 | k | 0,4W |
| 3481 | 4822 116 83864 | 10 | k | 0,5W |
| 3482 | 4822 116 83864 | 10 | k | 0,5W |
| 3483 | 4822 116 83864 | 10 | k | 0,5W |
| 3488 | 4822 051 10102 | 1 | k | 0,25W |
| 3490 | 4822 051 20223 | 22 | k | 0,1W |
| 3491 | 4822 116 83864 | 10 | k | 0,5W |
| 3492 | 4822 116 83884 | 47 | k | 0,5W |
| 3493 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3495 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3496 | 4822 117 11503 | 220 | R | 0.1W |
| 3497 | 4822 117 10833 | 10 | k | 0,1W |

▲... Safety component, use only this type

# Motherboard

| | | | | |
|---|---|---|---|---|
| 3498 | 4822 117 10833 | 10 | k | 0,1W |
| 3499 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3503 | 4822 116 83872 | 220 | R | 0,5W |
| 3504 | 4822 051 20759 | 75 | R | 0,1W |
| 3505 | 4822 051 20759 | 75 | R | 0,1W |
| 3506 | 4822 116 83872 | 220 | R | 0,5W |
| 3507 | 4822 117 11503 | 220 | R | 0.1W |
| 3508 | 4822 116 83872 | 220 | R | 0,5W |
| 3509 | 4822 117 11503 | 220 | R | 0.1W |
| 3510 | 4822 116 83872 | 220 | R | 0,5W |
| 3511 | 4822 051 20759 | 75 | R | 0,1W |
| 3512 | 4822 116 83872 | 220 | R | 0,5W |
| 3513 | 4822 117 11503 | 220 | R | 0.1W |
| 3514 | 4822 117 11503 | 220 | R | 0.1W |
| 3515 | 4822 117 11503 | 220 | R | 0.1W |
| 3516 | 4822 117 11503 | 220 | R | 0.1W |
| 3517 | 4822 116 83872 | 220 | R | 0,5W |
| 3518 | 4822 051 20759 | 75 | R | 0,1W |
| 3519 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3520 | 4822 117 10833 | 10 | k | 0,1W |
| 3521 | 4822 117 11507 | 6,8 | k | 0,1W |
| 3522 | 4822 117 11148 | 56 | k | 0,1W |
| 3523 | 4822 116 83881 | 390 | R | 0,5W |
| 3524 | 4822 116 52231 | 820 | R | 0,5W |
| 3525 | 4822 116 52271 | 33 | k | 0,5W |
| 3526 | 4822 116 83864 | 10 | k | 0,5W |
| 3527 | 4822 116 83864 | 10 | k | 0,5W |
| 3528 | 4822 116 52238 | 12 | k | 0,5W |
| 3529 | 4822 116 52175 | 100 | R | 0,5W |
| 3530 | 4822 116 52175 | 100 | R | 0,5W |
| 3531 | 4822 116 83864 | 10 | k | 0,5W |
| 3532 | 4822 116 83874 | 220 | k | 0,5W |
| 3533 | 4822 051 20224 | 220 | k | 0,1W |
| 3534 | 4822 116 83874 | 220 | k | 0,5W |
| 3535 | 4822 051 20224 | 220 | k | 0,1W |
| 3536 | 4822 116 83874 | 220 | k | 0,5W |
| 3537 | 4822 116 83874 | 220 | k | 0,5W |
| 3538 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3601 | 4822 116 83884 | 47 | k | 0,5W |
| 3602 | 4822 051 20225 | 2,2 | M | 0,1W |
| 3603 | 4822 051 20822 | 8,2 | k | 0,1W |
| 3604 | 4822 116 52175 | 100 | R | 0,5W |
| 3605 | 4822 116 52175 | 100 | R | 0,5W |
| 3606 | 4822 117 10833 | 10 | k | 0,1W |
| 3607 | 4822 117 11383 | 12 | k | 0,1W |
| 3608 | 4822 117 10965 | 18 | k | 0,1W |
| 3609 | 4822 051 20223 | 22 | k | 0,1W |
| 3610 | 4822 051 20332 | 3,3 | k | 0,1W |
| 3611 | 4822 116 52191 | 33 | R | 0,5W |
| 3612 | 4822 117 11507 | 6,8 | k | 0,1W |
| 3613 | 4822 051 20153 | 15 | k | 0,1W |
| 3614 | 4822 116 52283 | 4,7 | k | 0,5W |
| 3615 | 4822 051 20391 | 390 | R | 0,1W |
| 3616 | 4822 051 20681 | 680 | R | 0,1W |
| 3617 | 4822 117 10833 | 10 | k | 0,1W |
| 3618 | 4822 051 20475 | 4,7 | M | 0,1W |
| 3619 | 4822 051 20224 | 220 | k | 0,1W |
| 3620 | 4822 116 52256 | 2,2 | k | 0,5W |
| 3621 | 4822 051 20822 | 8,2 | k | 0,1W |
| 3622 | 4822 116 52257 | 22 | k | 0,5W |
| 3623 | 4822 117 11383 | 12 | k | 0,1W |
| 3624 | 4822 117 10834 | 47 | k | 0,1W |
| 3625 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3626 | 4822 100 12159 | 100 | k | |
| 3627 | 4822 117 11952 | 390 | k | 0,1W |
| 3628 | 4822 117 10834 | 47 | k | 0,1W |
| 3629 | 4822 117 11449 | 2,2 | k | 0,1W |
| 3630 | 4822 051 20681 | 680 | R | 0,1W |
| 3631 | 4822 116 52195 | 47 | R | 0,5W |
| 3632 | 4822 051 20109 | 10 | R | 0,1W |
| 3633 | 4822 051 20158 | 1,5 | R | 0,1W |
| 3640 | 4822 116 52219 | 330 | R | 0,5W |
| 3641 | 4822 117 10965 | 18 | k | 0,1W |
| 3642 | 4822 116 52219 | 330 | R | 0,5W |
| 3643 | 4822 051 20392 | 3,9 | k | 0,1W |
| 3644 | 4822 051 20224 | 220 | k | 0,1W |
| 3645 | 4822 051 20333 | 33 | k | 0,1W |
| 3646 | 4822 051 20683 | 68 | k | 0,1W |
| 3647 | 4822 051 20109 | 10 | R | 0,1W |
| 3648 | 4822 051 20158 | 1,5 | R | 0,1W |
| 3651 | 4822 116 83864 | 10 | k | 0,5W |

| | | | | | |
|---|---|---|---|---|---|
| 3652 | 4822 117 12708 | 39, 1 | k | | |
| 3653 | 4822 116 52175 | 100 | R | 0,5W | |
| 3654 | 4822 116 52175 | 100 | R | 0,5W | |
| 3655 | 4822 051 20683 | 68 | k | 0,1W | |
| 3656 | 4822 051 20562 | 5,6 | k | | |
| 3657 | 4822 051 20683 | 68 | k | 0,1W | |
| 3658 | 4822 051 20562 | 5,6 | k | | |
| 3659 | 4822 051 20104 | 100 | k | 0,1W | |
| 3660 | 4822 051 20104 | 100 | k | 0,1W | |
| 3661 | 4822 051 20104 | 100 | k | 0,1W | |
| 3662 | 4822 051 20104 | 100 | k | 0,1W | |
| 3663 | 4822 051 20475 | 4,7 | M | 0,1W | |
| 3664 | 4822 050 11002 | 1 | k | 0,4W | |
| 3701 | 4822 051 20333 | 33 | k | 0,1W | |
| 3702 | 4822 100 12157 | 10 | k | | |
| 3703 | 4822 116 52251 | 18 | k | 0,5W | |
| 3704 | 4822 116 52251 | 18 | k | 0,5W | |
| 3705 | 4822 117 10834 | 47 | k | 0,1W | |
| 3706 | 4822 051 20472 | 4,7 | k | 0,1W | |
| 3707 | 4822 051 20472 | 4,7 | k | 0,1W | |
| 3708 | 4822 051 20391 | 390 | R | 0,1W | |
| 3709 | 4822 051 20472 | 4,7 | k | 0,1W | |
| 3710 | 4822 051 20104 | 100 | k | 0,1W | |
| 3711 | 4822 051 20562 | 5,6 | k | | |
| 3711 | 4822 051 20472 | 4,7 | k | 0,1W | |
| 3712 | 4822 051 20101 | 100 | R | 0,1W | |
| 3714 | 4822 051 20101 | 100 | R | 0,1W | |
| 3715 | 4822 116 52175 | 100 | R | 0,5W | |
| 3716 | 4822 116 52256 | 2,2 | k | 0,5W | |
| 3717 | 4822 051 20223 | 22 | k | 0,1W | |
| 3718 | 4822 116 52249 | 1,8 | k | 0,5W | |
| 3719 | 4822 117 11454 | 820 | R | 0,1W | not for PAL BG |
| 3719 | 4822 051 10102 | 1 | k | 0,25W | only for PAL BG |
| 3720 | 4822 051 10102 | 1 | k | 0,25W | |
| 3721 | 4822 051 20562 | 5,6 | k | | |
| 3722 | 4822 100 12158 | 22 | k | | |
| 3724 | 4822 051 20331 | 330 | R | 0,1W | |
| 3724 | 4822 117 11504 | 270 | R | 0.1W | |
| 3725 | 4822 051 20154 | 150 | k | 0,1W | |
| 3726 | 4822 051 20331 | 330 | R | 0,1W | |
| 3727 | 4822 050 11002 | 1 | k | 0,4W | |
| 3728 | 4822 051 20471 | 470 | R | 0,1W | |
| 3728 | 4822 051 20391 | 390 | R | 0,1W | |
| 3729 | 4822 051 20391 | 390 | R | 0,1W | |
| 3730 | 4822 051 20471 | 470 | R | 0,1W | only for PAL BG |
| 3730 | 4822 051 20391 | 390 | R | 0,1W | only for SECAM |
| 3731 | 4822 051 20391 | 390 | R | 0,1W | |
| 3733 | 4822 051 20101 | 100 | R | 0,1W | |
| 3771 | 4822 116 52175 | 100 | R | 0,5W | |
| 3772 | 4822 051 20101 | 100 | R | 0,1W | |
| 3773 | 4822 051 20333 | 33 | k | 0,1W | |
| 3774 | 4822 051 20472 | 4,7 | k | 0,1W | |
| 3775 | 4822 051 20562 | 5,6 | k | | |
| 3776 | 4822 051 20562 | 5,6 | k | | |
| 3777 | 4822 116 83872 | 220 | R | 0,5W | |
| 3778 | 4822 116 83872 | 220 | R | 0,5W | |
| 3779 | 4822 116 83872 | 220 | R | 0,5W | |
| 3801 | 4822 117 12955 | 2,7 | k | | |
| 3802 | 4822 117 12955 | 2,7 | k | | |
| 3803 | 4822 051 20104 | 100 | k | 0,1W | |
| 3804 | 4822 116 83864 | 10 | k | 0,5W | |
| 3805 | 4822 116 52234 | 100 | k | 0,5W | |
| 3806 | 4822 116 52195 | 47 | R | 0,5W | |
| 3807 | 4822 116 52234 | 100 | k | 0,5W | |
| 3808 | 4822 116 52263 | 2,7 | k | 0,5W | |
| 3809 | 4822 117 11139 | 1,5 | k | 0,1W | |
| 3810 | 4822 051 20182 | 1,8 | k | 0,1W | |
| 3811 | 4822 116 52234 | 100 | k | 0,5W | |
| 3812 | 4822 116 52303 | 8,2 | k | 0,5W | |
| 3813 | 4822 116 52257 | 22 | k | 0,5W | |
| 3814 | 4822 116 52263 | 2,7 | k | 0,5W | |
| 3815 | 4822 051 20331 | 330 | R | 0,1W | |
| 3816 | 4822 116 52263 | 2,7 | k | 0,5W | |
| 3817 | 4822 100 12155 | 2,2 | k | | |
| 3818 | 4822 116 52231 | 820 | R | 0,5W | |
| 3819 | 4822 117 10965 | 18 | k | 0,1W | |
| 3820 | 4822 117 10965 | 18 | k | 0,1W | |
| 3821 | 4822 116 52257 | 22 | k | 0,5W | |
| 3822 | 4822 051 20223 | 22 | k | 0,1W | |
| 3823 | 4822 051 20474 | 470 | k | 0,1W | |
| 3830 | 4822 051 20472 | 4,7 | k | 0,1W | |

## Motherboard

| | | | |
|---|---|---|---|
| 3831 | 4822 051 20104 | 100 k | 0,1W |
| 3832 | 4822 051 20223 | 22 k | 0,1W |
| 3833 | 4822 051 20153 | 15 k | 0,1W |
| 3834 | 4822 051 20472 | 4,7 k | 0,1W |
| 3835 | 4822 051 20472 | 4,7 k | 0,1W |
| 3836 | 4822 051 20472 | 4,7 k | 0,1W |
| 3837 | 4822 117 11449 | 2,2 k | 0,1W |
| 3838 | 4822 117 11449 | 2,2 k | 0,1W |
| 3839 | 4822 051 20106 | 10 M | 0,1W |
| 3840 | 4822 051 20106 | 10 M | 0,1W |
| 3841 | 4822 051 20333 | 33 k | 0,1W |
| 3842 | 4822 051 20333 | 33 k | 0,1W |
| 3843 | 4822 051 20333 | 33 k | 0,1W |
| 3844 | 4822 051 20333 | 33 k | 0,1W |
| 3845 | 4822 051 20333 | 33 k | 0,1W |
| 3846 | 4822 051 20333 | 33 k | 0,1W |
| 3849 | 4822 051 20104 | 100 k | 0,1W |
| 3851 | 4822 051 20683 | 68 k | 0,1W |
| 3852 | 4822 051 20332 | 3,3 k | 0,1W |
| 3853 | 4822 051 20332 | 3,3 k | 0,1W |
| 3854 | 4822 116 52195 | 47 R | 0,5W |
| 3855 | 4822 116 52195 | 47 R | 0,5W |
| 3856 | 4822 051 20274 | 270 k | 0,1W |
| 3857 | 4822 116 52175 | 100 R | 0,5W |
| 3858 | 4822 116 52175 | 100 R | 0,5W |
| 3859 | 4822 116 52195 | 47 R | 0,5W |
| 3863 | 4822 116 52195 | 47 R | 0,5W |
| 3867 | 4822 051 20101 | 100 R | 0,1W |
| 3868 | 4822 117 11449 | 2,2 k | 0,1W |
| 3869 | 4822 116 52231 | 820 R | 0,5W |
| 3870 | 4822 117 11454 | 820 R | 0,1W |
| 3881 | 4822 117 11454 | 820 R | 0,1W |
| 3882 | 4822 116 52231 | 820 R | 0,5W |
| 3883 | 4822 051 20474 | 470 k | 0,1W |
| 3884 | 4822 117 10839 | 130 k | 0.1W |
| 3885 | 4822 116 52285 | 470 k | 0,5W |
| 3886 | 4822 116 83864 | 10 k | 0,5W |

### *RESISTORS*

| | | |
|---|---|---|
| 4100 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4101 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4102 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4103 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4104 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4105 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4106 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4107 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4108 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4110 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4111 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4452 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4454 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4481 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4482 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4485 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4486 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4487 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4488 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4489 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4490 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4491 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4492 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4493 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4494 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4496 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4498 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4501 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4651 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4652 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4701 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4702 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4703 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4704 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4705 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4711 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4712 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4722 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4723 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4724 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4771 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4772 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4911 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4912 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4914 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4915 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4916 | 4822 051 20101 | 100R00 5% 0,1W |

### *COILS*

| | | |
|---|---|---|
| 5001 | 4822 157 51462 | 10UH |
| 5002 | 4822 157 11145 | 150UH 5% |
| 5003 | 4822 157 51462 | 10UH |
| 5004 | 4822 157 11149 | 56UH 5% |
| 5005 | 4822 157 11142 | 47UH 5% |
| 5006 | 4822 157 10972 | 15UH 5% |
| 5008 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5009 | 4822 157 11228 | LAN02TB101J |
| 5010 | 4822 157 11139 | 6,8UH 5% |
| 5061 | 4822 157 63661 | FIL LC VAR 4M286 5VS |
| 5062 | 4822 157 11149 | 56UH 5% |
| 5063 | 4822 157 11145 | 150UH 5% |
| 5064 | 4822 157 63661 | FIL LC VAR 4M286 5VS |
| 5065 | 4822 157 11145 | 150UH 5% |
| 5066 | 4822 157 10972 | 15UH 5% |
| 5067 | 4822 157 11738 | 330UH 5% 5X3 |
| 5068 | 4822 157 11145 | 150UH 5% |
| 5069 | 4822 157 11228 | LAN02TB101J |
| 5070 | 4822 157 63659 | FIL LC VAR 1G072 5V2 |
| 5071 | 4822 157 10972 | 15UH 5% |
| 5072 | 4822 157 10972 | 15UH 5% |
| 5073 | 4822 157 10972 | 15UH 5% |
| 5100 | 4822 157 11733 | 22UH 5% 5X3 |
| 5101 | 4822 157 50961 | 22 µH |
| 5322 | 4822 157 50961 | 22 µH |
| 5323 | 4822 157 53941 | COIL 100MUH PM10 |
| 5451 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5452 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5453 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5454 | 4822 157 60147 | 2,2UH |
| 5455 | 4822 157 71206 | BLM21A601SPT |
| 5456 | 4822 157 71206 | BLM21A601SPT |
| 5457 | 4822 157 71206 | BLM21A601SPT |
| 5471 | 4822 157 11734 | 0,33UH 10% 2,4X3,4 |
| 5501 | 4822 157 11139 | 6,8UH 5% |
| 5601 | 4822 157 70038 | 10000UH 5% 6,8X11 |
| 5602 | 4822 157 53531 | COIL ASSY |
| 5641 | 4822 157 53531 | COIL ASSY |
| 5701 | 4822 157 71206 | BLM21A601SPT |
| 5702 | 4822 157 70877 | H292ONS-6785NK |
| 5703 | 4822 157 11231 | LAN02TB1R0J |
| 5704 | 4822 157 70877 | H292ONS-6785NK |
| 5705 | 4822 157 11733 | 22UH 5% 5X3 |
| 5706 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5708 | 4822 157 10972 | 15UH 5% |
| 5771 | 4822 157 70038 | 10000UH 5% 6,8X11 |
| 5772 | 4822 157 71206 | BLM21A601SPT |
| 5801 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5802 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5803 | 4822 157 71206 | BLM21A601SPT |
| 5804 | 4822 157 71206 | BLM21A601SPT |
| 5805 | 4822 157 71206 | BLM21A601SPT |
| 5806 | 4822 157 71206 | BLM21A601SPT |
| 5807 | 4822 157 71206 | BLM21A601SPT |
| 5851 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5852 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5853 | 4822 157 11706 | 10UH 5% 2,4X3,4 |
| 5854 | 4822 157 10972 | 15UH 5% |
| 5856 | 4822 157 11139 | 6,8UH 5% |

### *DIODES*

| | | |
|---|---|---|
| 6061 | 4822 130 32778 | 1SS133 |
| 6401 | 4822 130 31983 | BAT85 |
| 6460 | 4822 130 10231 | SET:2X SENS + 1X LED |
| 6460 | 4822 130 10231 | SET:2X SENS + 1X LED |
| 6502 | 4822 130 34197 | BZX79-B12 |
| 6503 | 4822 130 80318 | MTZ6.8C |
| 6504 | 4822 130 34197 | BZX79-B12 |
| 6505 | 4822 130 34197 | BZX79-B12 |

# Motherboard

| | | |
|---|---|---|
| 6506 | 4822 130 34197 | BZX79-B12 |
| 6507 | 4822 130 34197 | BZX79-B12 |
| 6508 | 4822 130 34197 | BZX79-B12 |
| 6601 | 4822 130 30861 | BZX79-B7V5 |
| 6701 | 4822 130 10414 | BA792 |
| 6702 | 4822 130 10414 | BA792 |

## *TRANSISTORS & IC's*

| | | |
|---|---|---|
| 7001 | 4822 130 60511 | BC847B |
| 7002 | 4822 130 60511 | BC847B |
| 7003 | 4822 209 15526 | LC89980M |
| 7004 | 5322 130 60508 | BC857B |
| 7005 | 4822 209 16883 | LA71527M |
| 7006 | 4822 130 60511 | BC847B |
| 7007 | 4822 130 10872 | MMUN2112L |
| 7008 | 4822 130 60511 | BC847B |
| 7009 | 4822 130 60511 | BC847B |
| 7010 | 5322 130 42718 | BFS20 |
| 7011 | 5322 130 42718 | BFS20 |
| 7014 | 4822 130 60511 | BC847B |
| 7015 | 5322 130 60508 | BC857B |
| 7016 | 4822 130 60511 | BC847B |
| 7061 | 4822 130 60511 | BC847B |
| 7062 | 4822 209 73852 | PMBT2369 |
| 7063 | 4822 130 60511 | BC847B |
| 7064 | 4822 130 63732 | MMUN2212 |
| 7065 | 5322 130 60508 | BC857B |
| 7066 | 4822 209 90189 | TDA4722/V2 |
| 7067 | 4822 130 60511 | BC847B |
| 7068 | 5322 130 60508 | BC857B |
| 7091 | 5322 209 11306 | HEF4094BT |
| 7092 | 4822 130 63732 | MMUN2212 |
| 7101 | 4822 130 60511 | BC847B |
| 7102 | 4822 130 60511 | BC847B |
| 7103 | 4822 209 15548 | STV5744AD |
| 7104 | 4822 209 90421 | STV5712 |
| 7105 | 4822 130 10872 | MMUN2112L |
| 7106 | 4822 130 10872 | MMUN2112L |
| 7107 | 4822 130 63732 | MMUN2212 |
| 7322 | 4822 130 10802 | BSH101 |
| 7323 | 4822 130 10214 | STD17N06 |
| 7324 | 4822 130 60511 | BC847B |
| 7325 | 4822 130 41344 | BC337-40 |
| 7326 | 4822 130 41327 | BC327-40 |
| 7327 | 5322 130 60508 | BC857B |
| 7328 | 4822 130 60511 | BC847B |
| 7329 | 4822 130 60511 | BC847B |
| 7330 | 4822 130 10802 | BSH101 |
| 7401 | 4822 209 16954 | ST24E16M6-22RC548/00 |
| 7404 | 4822 130 60511 | BC847B |
| 7406 | 4822 209 16884 | Deck/Control µP |
| 7407 | 4822 130 41344 | BC337-40 |
| 7408 | 5322 130 60508 | BC857B |
| 7412 | 4822 130 10872 | MMUN2112L |
| 7413 | 4822 130 60511 | BC847B |
| 7414 | 4822 130 60511 | BC847B |
| 7415 | 4822 130 60511 | BC847B |
| 7440 | 4822 209 30146 | L2722 |
| 7441 | 4822 130 10872 | MMUN2112L |
| 7442 | 4822 130 60511 | BC847B |
| 7443 | 4822 209 30836 | SAA1310/N2 |
| 7446 | 4822 209 13126 | TDA5241 |
| 7451 | 4822 209 16854 | EPROM ACOP5 |
| 7452 | 4822 209 16946 | CY62256LL-70PC |
| 7461 | 4822 130 10231 | SET:2X SENS + 1X LED |
| 7462 | 4822 130 10231 | SET:2X SENS + 1X LED |
| 7464 | 4822 130 10233 | TCRT5000L |
| 7465 | 4822 130 10233 | TCRT5000L |
| 7466 | 4822 130 10234 | TCST1030L |
| 7502 | 4822 130 42615 | BC817-40 |
| 7504 | 4822 130 60511 | BC847B |
| 7505 | 4822 130 63732 | MMUN2212 |
| 7506 | 4822 209 16886 | STV6401 |
| 7508 | 4822 130 63732 | MMUN2212 |
| 7603 | 4822 130 60373 | BC856B |
| 7604 | 4822 130 41327 | BC327-40 |
| 7605 | 5322 130 60159 | BC846B |
| 7606 | 5322 130 60159 | BC846B |
| 7607 | 4822 130 60511 | BC847B |
| 7608 | 4822 130 42615 | BC817-40 |
| 7641 | 5322 130 60508 | BC857B |
| 7642 | 4822 130 60511 | BC847B |
| 7643 | 4822 130 42615 | BC817-40 |
| 7651 | 4822 209 16887 | TDA9616H/N1 |
| 7701 | 4822 130 63732 | MMUN2212 |
| 7703 | 4822 130 60511 | BC847B |
| 7704 | 4822 130 60511 | BC847B |
| 7705 | 4822 209 90452 | TDA9814T/V3 for SECAM L |
| 7705 | 4822 209 90431 | TDA9813T/V2 not for SECAM L |
| 7706 | 5322 130 60508 | BC857B |
| 7707 | 5322 130 42755 | BC847C |
| 7708 | 4822 209 60792 | 74HC4053D |
| 7709 | 4822 130 60511 | BC847B |
| 7771 | 4822 209 32501 | TDA9840T/V2 |
| 7801 | 5322 130 42718 | BFS20 |
| 7802 | 5322 130 60508 | BC857B |
| 7803 | 4822 209 60177 | LM339D |
| 7804 | 5322 130 42718 | BFS20 |
| 7805 | 4822 130 10872 | MMUN2112L |
| 7806 | 4822 130 10872 | MMUN2112L |
| 7807 | 4822 209 16888 | TA1225N |
| 7830 | 4822 209 80631 | LM339N-00 |
| 7831 | 4822 130 60511 | BC847B |
| 7832 | 4822 130 60511 | BC847B |
| 7851 | 4822 209 16889 | SDA5652P |
| 7854 | 5322 130 60508 | BC857B |
| 7855 | 4822 130 60511 | BC847B |
| 7856 | 5322 130 60508 | BC857B |
| 7857 | 4822 209 63604 | BA7046F |

# Connector PCB ACP3, CABLES & SUB MODULS

| | | | |
|---|---|---|---|
| 3580 | 4822 051 20104 | 100 k | 0,1W |
| 3581 | 4822 117 10833 | 10 k | 0,1W |
| 3582 | 4822 051 20229 | 22 R | 0,1W |
| 3583 | 4822 051 20153 | 15 k | 0,1W |
| 3584 | 4822 051 20153 | 15 k | 0,1W |
| 3585 | 4822 051 20474 | 470 k | 0,1W |
| 3586 | 4822 117 11149 | 82 k | 0,1W |
| 3587 | 4822 051 20472 | 4,7 k | 0,1W |
| 3588 | 4822 117 11503 | 220 R | 0.1W |

### *RESISTORS*

| | | |
|---|---|---|
| 4500 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4501 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4502 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4503 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4504 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4505 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4506 | 4822 051 20008 | 0R00 JUMP. (0805) |
| 4507 | 4822 051 20008 | 0R00 JUMP. (0805) |

### *COILS*

| | | |
|---|---|---|
| 5551 | 4822 157 11145 | 150UH 5% |
| 5552 | 4822 157 11228 | LAN02TB101J |
| 5553 | 4822 157 11145 | 150UH 5% |
| 5555 | 4822 157 11139 | 6,8UH 5% |
| 5556 | 4822 157 11145 | 150UH 5% |
| 5557 | 4822 157 11739 | 220UH 5% 2,4X3,4 |

### *DIODES*

| | | |
|---|---|---|
| 6551 | 4822 130 34197 | BZX79-B12 |
| 6552 | 4822 130 34197 | BZX79-B12 |
| 6553 | 4822 130 34278 | BZX79-B6V8 |
| 6554 | 4822 130 34278 | BZX79-B6V8 |
| 6555 | 4822 130 83757 | BAS216 |
| 6556 | 4822 130 83757 | BAS216 |
| 6557 | 4822 130 34278 | BZX79-B6V8 |
| 6558 | 4822 130 34278 | BZX79-B6V8 |
| 6559 | 4822 130 34197 | BZX79-B12 |
| 6560 | 4822 130 34197 | BZX79-B12 |

### *TRANSISTORS & IC's*

| | | |
|---|---|---|
| 7520 | 4822 209 16193 | TDA7053AT |
| 7551 | 5322 130 42755 | BC847C |
| 7552 | 5322 130 42755 | BC847C |
| 7553 | 4822 130 41096 | BC550C |
| 7554 | 4822 130 41096 | BC550C |

## CABLES

| | | |
|---|---|---|
| | 4822 320 50377 | ANTENNA cable |
| | 4822 321 63002 | SCART cable |
| ⚠ | 4822 321 10249 | SBC1201 MAINS CABLE |
| ⚠ | 4822 321 10886 | MAINS CABLE UK |
| | 4822 320 50377 | CONNECT. CABLE PAL |
| | 4822 321 63002 | SCART CABLE(PROJ.50) |
| | 4822 321 62401 | AUDIO-CABLE |
| 8001 | 4822 320 11889 | FFC TD1-1961 |
| 8003 | 4822 320 12453 | FFC 3POL TD3-1947 |
| 8004 | 4822 320 12454 | FFC 6POL TD4-1948 |
| 8011 | 4822 320 12455 | FFC 7POL 1982-1956 |
| 8012 | 4822 320 12453 | FFC 3POL TD3-1947 |
| 8013 | 4822 320 12461 | FFC 1961-1102 |
| 8014 | 4822 320 12456 | FFC 3POL 1929-1922 |
| 8015 | 4822 320 12457 | FFC 4POL 1925-1921 |
| 8018 | 4822 320 12458 | FFC 17POL 1915-1942 |
| 8020 | 4822 320 12459 | FFC 14POL 1944-1920 |

## SUB MODULES

| | | |
|---|---|---|
| 1972 | 4822 214 12236 | QNIC |

## REPAIR KITS

| | |
|---|---|
| 4822 310 11237 | POWER SUPPLY REPAIR KIT |

⚠... Safety component, use only this type